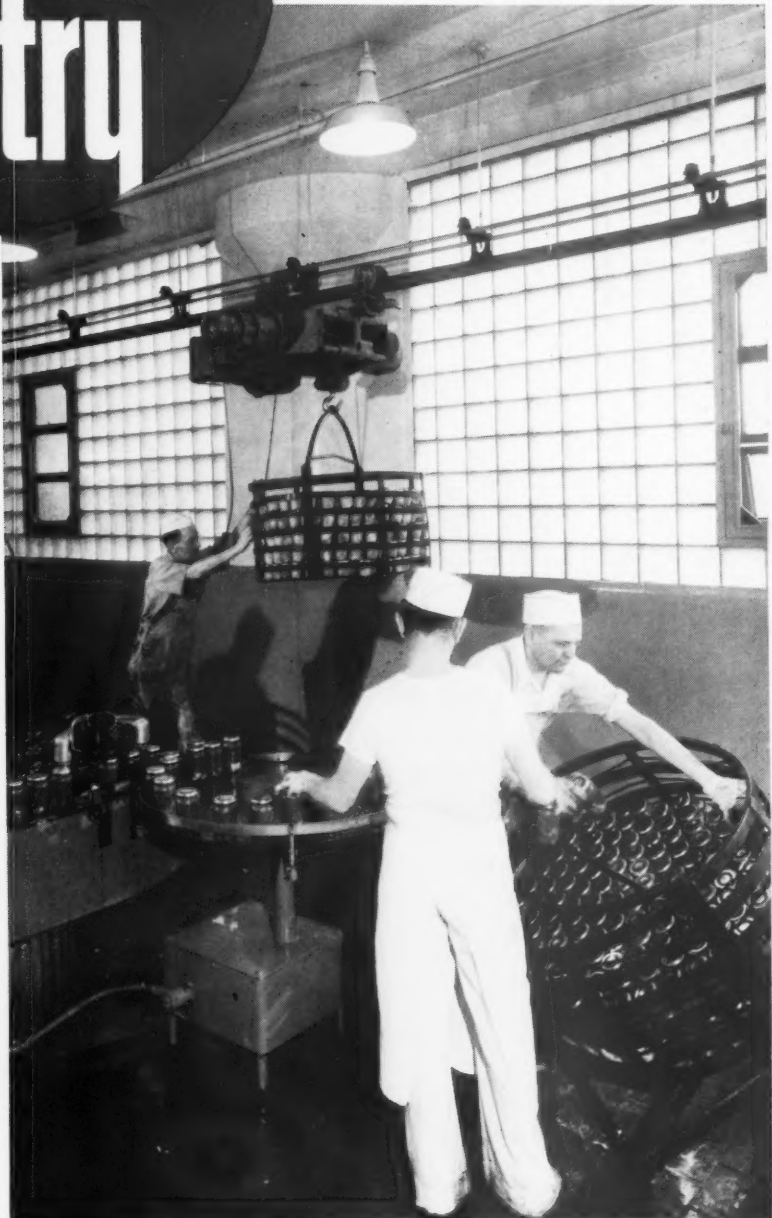


Western Industry

September 1954



Cans and jars of boned chicken and turkey are canned, sealed, packed in baskets, and cooked in rows of retorts, prior to being cooled and shipped to consumers . . . A farmers' co-operative makes this efficient, spotless operation possible.

. . . see page 34

Safety pays off
Lubing roundup

Standby power uses
Small plant survey

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WANT YOUR SHIPPING COSTS CUT **50%?**



Frankly, we can't cut everybody's shipping costs 50%. Some we can only help out about 25%, or 33%. And some not at all.

We make wirebound wooden shipping containers. In this field, we're largest in the West. Western manufacturers have used our containers for decades, for machinery, nuts and bolts, kitchen stoves, furnaces, all kinds of products.

But for some things, wirebounds just won't work. If wirebounds can't help your company, our engineers will tell you right away. If they can, we'll show you how *much*, in terms of dollars and cents saved.



If you'd like to give this more thought, we have a new booklet showing how other well-known western manufacturers have cut costs with Cabco containers.

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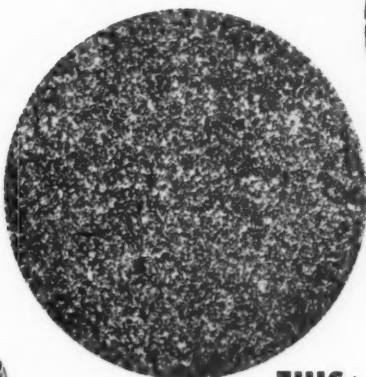


*Product of California Barrel Company, Ltd.,
the West's oldest, foremost designer and manu-
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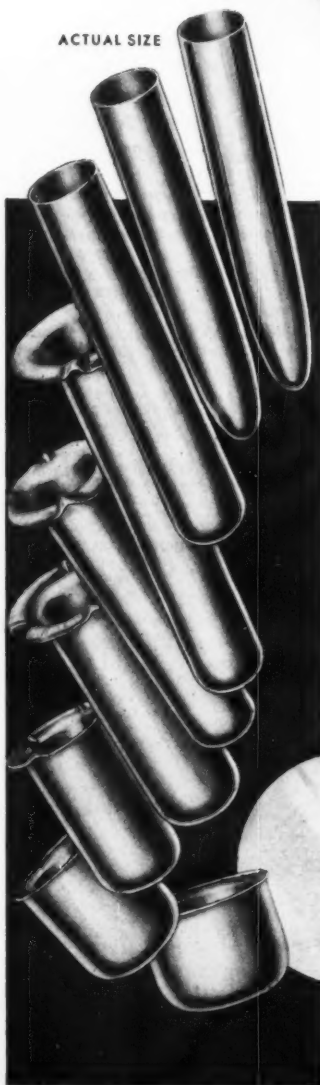
You don't need 3-D glasses to see the difference



THIS is a 75X magnification of ordinary drawing brass—the kind that's been used for decades for stamped or drawn brass products.

THIS is a 75X magnification of super-fine-grain Formbrite.* Isn't it obvious that this new type of brass can be polished in half the time? Frequently, a simple color buff will bring up the desired finish for lacquering or plating.

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AND, Formbrite is harder, stronger, springier and more scratch-resistant than ordinary drawing brass, yet has demonstrated its remarkable ductility for forming and drawing operations, and ability to take sharp, clean-cut ornamental die impressions.

With all these advantages, Formbrite costs no more. What can we do to help you try this time- and cost-saving metal? Mail you a booklet? Send you a sample? Ask our Sales Representative to call? Simply write to The American Brass Company, General Offices: Waterbury 20, Conn. District Sales Offices: Los Angeles 17, Calif. at 816 West 5th St.—San Francisco 4, Calif. at 111 Sutter Building—Seattle 1, Washington at 953 Stuart Building.

*Reg. U. S. Pat. Off.

5485W

Here's an example of Formbrite at work. These pen caps are made of .0125"-thick Red Brass Formbrite strip at the rate of 2,000 an hour on a thirty-ton, 10-step multiple plunger press. Caps are buffed at a higher rate than with any other metal previously used.

DRAWING BRASS

an **ANACONDA**® Product

made by The American Brass Company

For more details circle No. 2 on Reader Service Postcard



SEPTEMBER 1954

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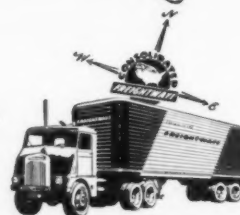
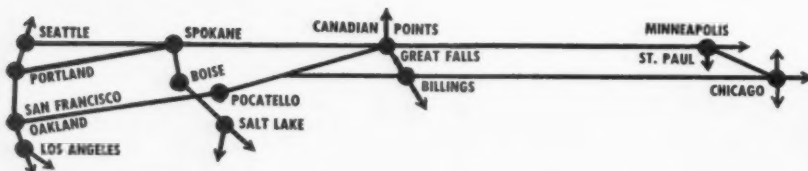
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- ③ State Highway 50 (to San Joaquin Valley)
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- ⑤ Western Pacific R.R., main line
- ⑥ Hayward Municipal Airport (Executive plane and air freight terminal)
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fully crowned tooth form...

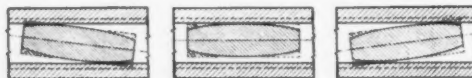
...IS THE SOURCE OF
High Misalignment Capacity*

IN **Amerigear**[®]
COUPLINGS

● An engineered application, using advantages of the Patented Amerigear HMC* Flexible Coupling, can solve any power transmission problem arising from:

- Excessive lateral and angular misalignments;
- Tight backlash requirements;
- Space limitations;
- High speeds and loads;
- Continuous operation;

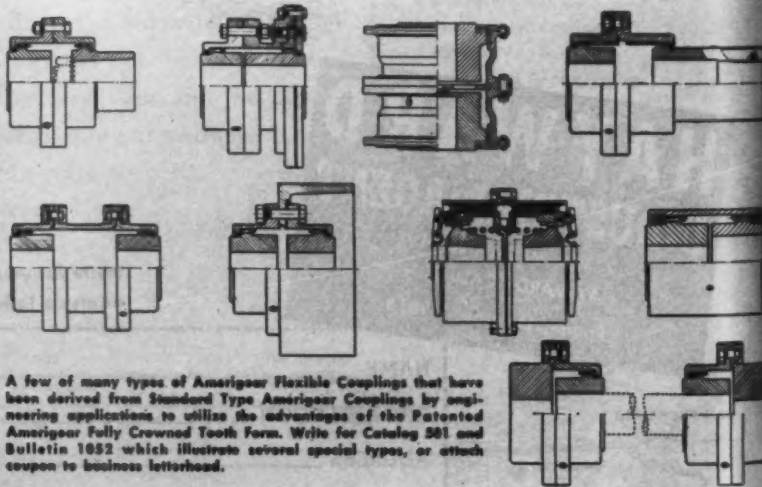
or any combination of these



Comparison with gearing of conventional gear-type couplings shows how Patented Amerigear Tooth Form eliminates tooth end loading and simultane-

ously allows for both lateral and angular misalignment. Dotted lines indicate gear teeth of conventional gear couplings.

Illustrating Full
Cycle Misalign-
ment Pattern
of Amerigear
H.M.C.* Patent-
ed Tooth Form.



A few of many types of Amerigear Flexible Couplings that have been derived from Standard Type Amerigear Couplings by engineering applications to utilize the advantages of the Patented Amerigear Fully Crowned Tooth Form. Write for Catalog 581 and Bulletin 1852 which illustrate several special types, or attach coupon to business letterhead.

Amerigear[®] **HMC* FLEXIBLE COUPLING**

One of several standard types embodying the Patented Amerigear Tooth Form
Patented and Patents Pending

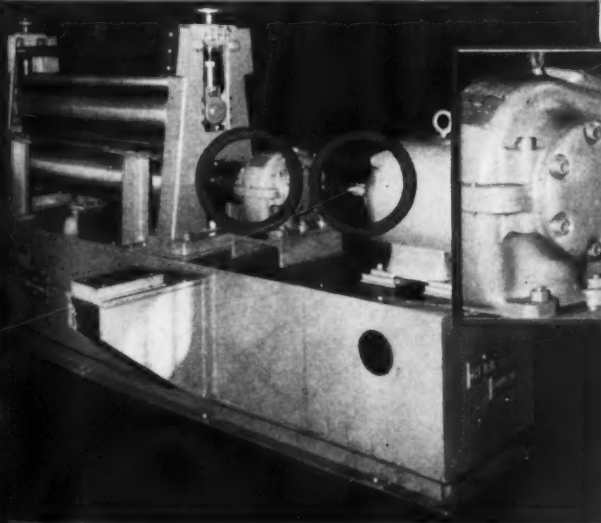
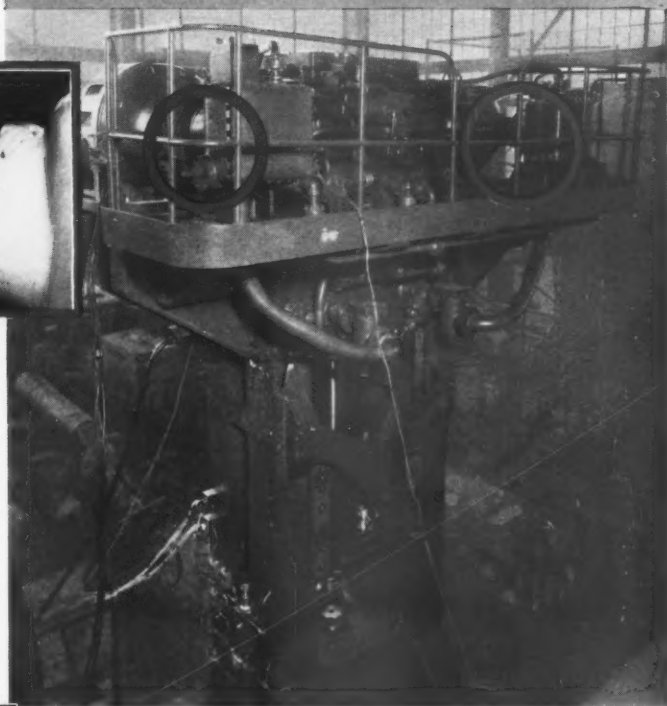
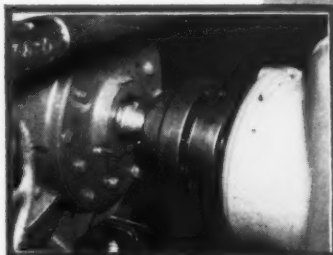


Amerigear[®] HIGH MISALIGNMENT CAPACITY* COUPLINGS

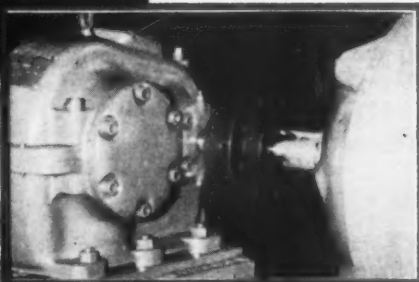
Solve power transmission problems for wide variety of metal working equipment!

Bliss 350-Ton Capacity Hydro-Dynamic Press having dual pump and motor drive units which are equipped with Amerigear HMC[®] Couplings. Photo courtesy of E. W. Bliss Company, Canton, Ohio.

In this application a Standard Type of Amerigear HMC[®] Coupling is a vital part of the pump and motor drive units on a 350-ton capacity Bliss Hydro-Dynamic Hot Nosing Press. The pump and motor drive unit operating at 1200 r.p.m. provides hydraulic pressure to operate the press ram. Every 10 seconds the operating load transmitted increases from 125 h.p. to 150 h.p. and is held for approximately 2 seconds—thus, the load being transmitted fluctuates several times per minute. There are two pump and motor drive units on this press. This is a typical example of how a Standard Type Amerigear HMC[®] Coupling is utilized to solve power transmission problems arising from a fluctuating load, tight backlash requirement, space limitation, and lateral and angular misalignment conditions.



Pinch Rolls as manufactured by Herr Engineering Company on which two Standard Type Amerigear HMC[®] Couplings are used for the driving unit. Photo courtesy of Herr Engineering Company, Warren, Ohio.



One of several applications of Standard Type Amerigear HMC[®] Couplings installed on Pinch Rolls manufactured by Herr Engineering Company. In this application two Amerigear HMC[®] Couplings are used; one on the rotating shaft between the motor and the gear reducer, and another between the gear reducer and the roll end. Herr Engineering also use Standard Types of Amerigear HMC[®] Couplings for their Pay-off Reels, Take-up Reels, Slitters and other steel finishing equipment. In this application Amerigear HMC[®] Couplings with Patented Tooth Form are transmitting power under shock loading conditions. They minimize the effect of any lateral or angular misalignment which may occur, thereby reducing maintenance costs to an all-time low.

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Amerigear Engineers are available to assist in engineering special applications of the Amerigear Patented Crowned Tooth Form and for adapting Amerigear Standard Type HMC[®] Couplings to solve your power transmission problems. Write for Catalog 501 and Bulletin 1052, or attach coupon to your business letterhead.

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PACIFIC COAST DISTRIBUTORS
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1215 N. W. Everett St., Portland 9, Oregon

WAREHOUSES AND OFFICES IN ALL PRINCIPAL WESTERN CITIES

Canada: Canadian Zurn Engineering Ltd., 2052 St. Catherine St. W., Montreal 25, P. Q.

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Please send me further information regarding AMERIGEAR COUPLINGS with the Patented Fully Crowned Tooth Form as described in Catalog No. 501 and Bulletin 1052.

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Company
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City Zone State
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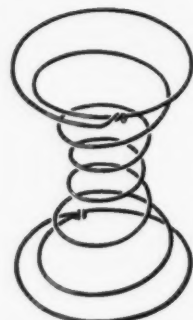
One of our standard grades may suit your needs perfectly. Or your specifications may require one of our special-purpose grades. Either way, you can count on our paying careful attention to the manufacturing details that will give you the kind of results you're looking for.

Like to talk over your problems in steel wire? Perhaps our wire-making experience could be of real help to you right now. Just phone our nearest sales office.

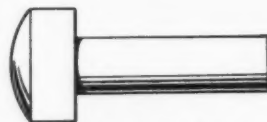
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Sales Offices: Los Angeles, San Francisco, Portland, Seattle, Spokane

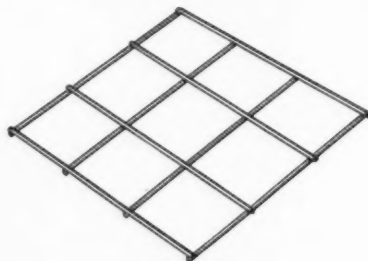
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Trade-Mark

**MAKES OXYGEN-CUTTING
FAST, EASY and ACCURATE**

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No need to allow for kerf in the size of templates—you merely set a dial to compensate for the kerf width of the nozzle in use. Parts are reproduced to tolerances ranging from plus or minus $7/32$ -in. to $1/16$ -in.—clean and smooth, and at high speeds.

Simple to set up—no special tools are required for making templates, they can be cut from VINYLITE plastic sheets with a knife or shears . . . The templet is simply mounted on the tracing table with masking tape. Your LINDE representative will be glad to discuss your needs, and help you determine the best setups for your oxygen-cutting operations. Start saving now—call him today for more information.

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The terms "Oxweld," "Linde," and "Vinylite" are registered trade-marks of Union Carbide and Carbon Corporation.

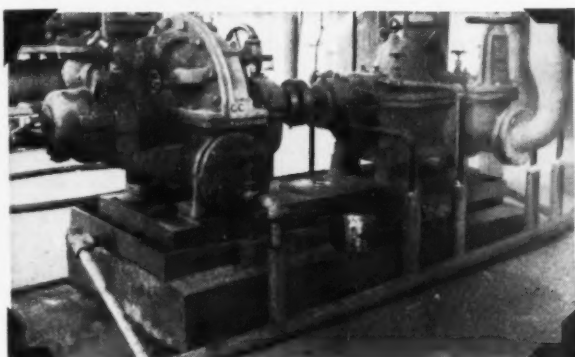
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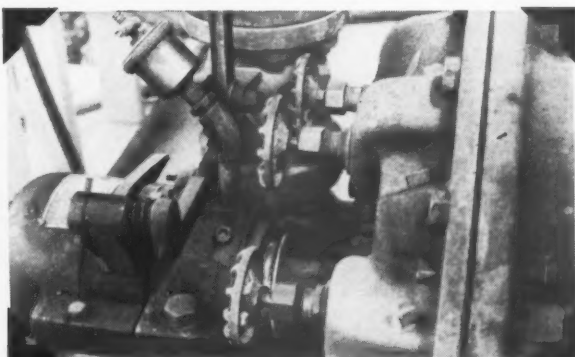
STANDARD ENGINEER'S REPORT

	DATA
LUBRICANT	Calol O.H.T. Grease
UNIT	Steam Turbine bearings
OPERATION	Pump and blower
CONDITIONS	220° F. bearing temp. long shutdowns
FIRM	Libby, McNeill & Libby Selma, Calif.

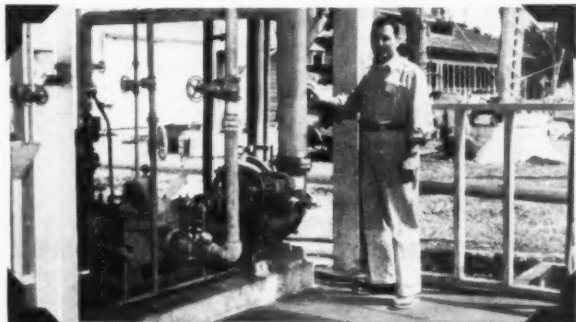
Special grease stays in hot bearings, ends rusting!



CALOL O.H.T. GREASE completely eliminated problem of grease throwing from bearings of steam turbines in the Libby, McNeill & Libby fruit canning plant at Selma, Calif. Other grease tried threw out of bearings onto floor, causing dangerously slippery foot-



ing, and allowed bearings to rust during shutdown period from October 15 to middle of June. Used since July, 1951, Calol O.H.T. Grease has ended rusting, stays in place even though bearings run in constant moisture at temperatures from 200° to 220° F.



TURBINE BEARINGS no longer rust during shutdown and never run dry, according to Lloyd Ghilardi, Chief Mechanic. This stable, heat-resistant grease has solved many unusual lubrication problems, is recommended for all types of bearings in severe service.

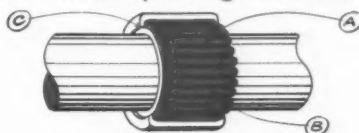


FREE CATALOG: "How to Save Money on Equipment Operation", a booklet full of valuable information, is ready for you. Write or ask for your free copy today.

TRADEMARK "CALOL" REG. U.S. PAT. OFF.



How Calol O.H.T. Grease protects bearings in severest operating conditions



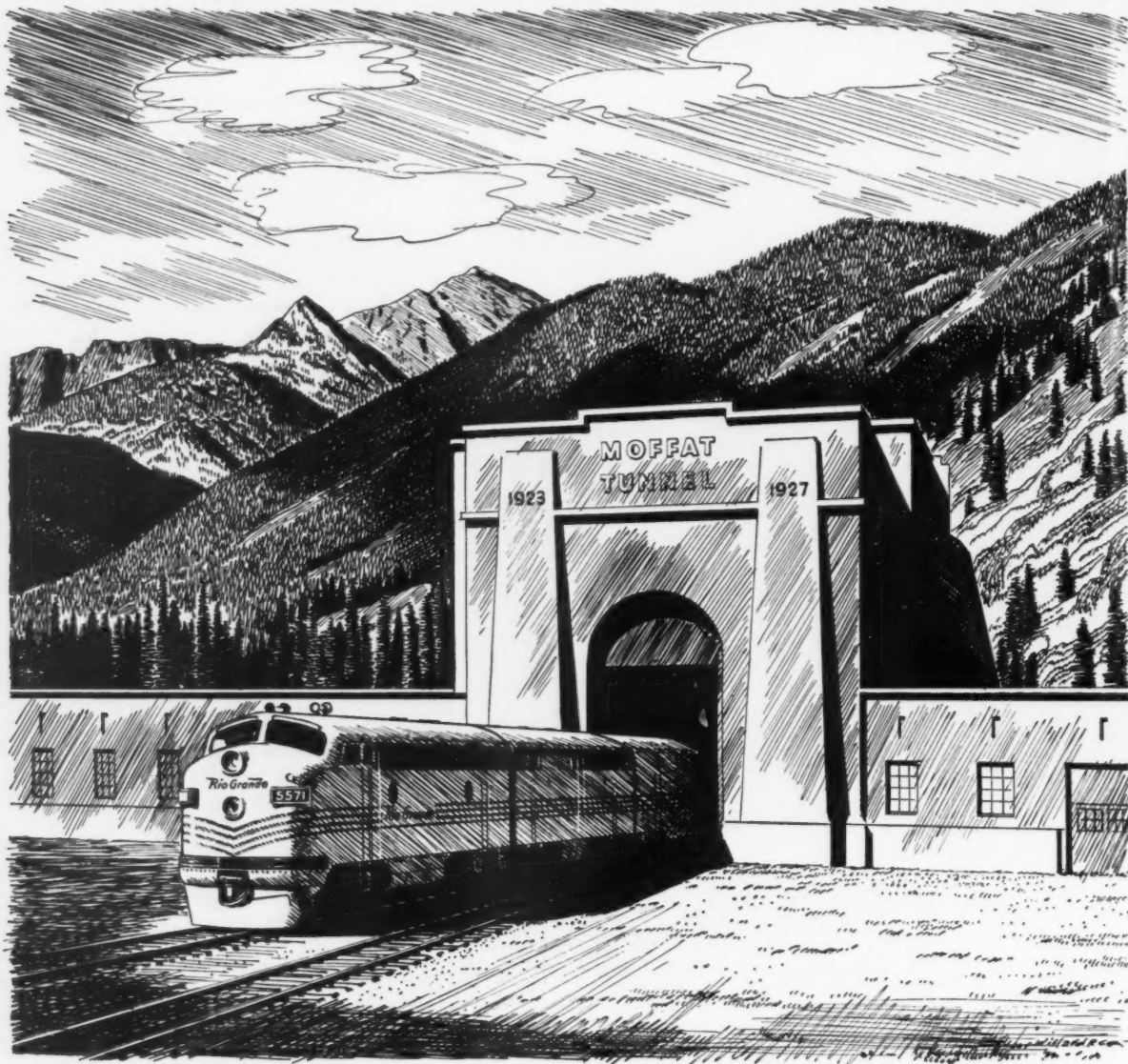
Used in any type of bearing under any operating condition, high temperature-low speed, high speeds to 10,000 rpm, temperatures from minus 10°F. to 400°F., Calol O.H.T. Grease will last indefinitely.

- A. Contains special oxidation inhibitor—helps prevent rusting, corrosion, hardening of grease at any time.
- B. Resists high temperatures—eliminates coking and formation of deposits.
- C. Provides excellent seal against water . . . lubricates efficiently in slight moisture.

STANDARD TECHNICAL SERVICE checked this product performance. For expert help on lubrication or fuel problems, call your Standard Fuel and Lubricant Engineer or Representative; or write Standard Oil Company of California, 225 Bush St., San Francisco.

STANDARD OIL COMPANY OF CALIFORNIA

UNITED STATES STEEL AT WORK IN THE WEST—the Moffat Tunnel, 2nd longest in the United States



ROCKY MOUNTAIN SHORTCUT... made safe by steel!

More than six miles in length, the Moffat Tunnel pierces the Continental Divide due West of Denver, Colorado. They finished it in 1927 yet old timers still remember how 12" x 14" supporting timbers snapped under the pressure. So for strength and safety they were replaced with special steel beams ...made in the mills of United States Steel.

Yesterday, Today, and Tomorrow—Columbia-Geneva has for years helped to fill the steel needs of the West. We hope that when you need steel, you'll continue to look first to Columbia-Geneva, Western producing member of the industrial family that serves the nation—United States Steel.

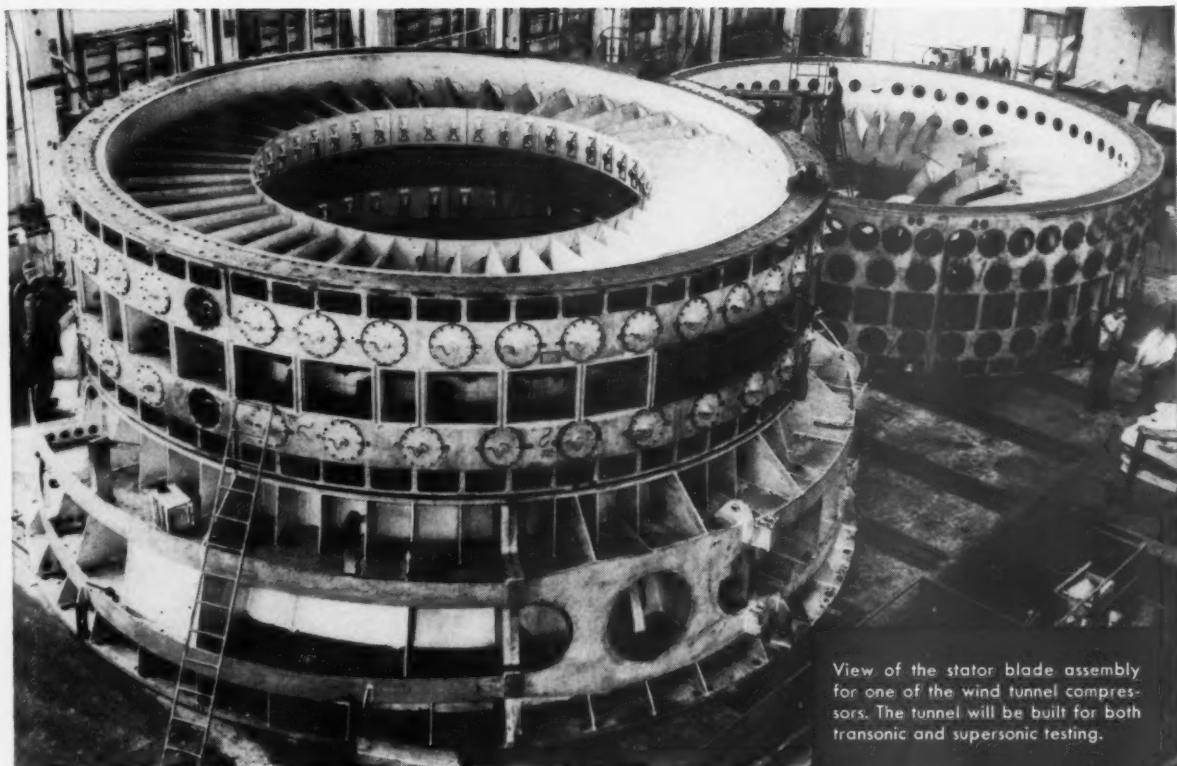
West's Largest Steel Producer

United States Steel Corporation • Columbia-Geneva Steel Division

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UNITED STATES STEEL



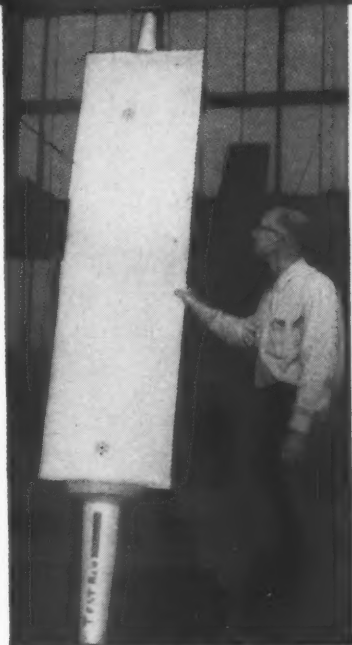
View of the stator blade assembly for one of the wind tunnel compressors. The tunnel will be built for both transonic and supersonic testing.

Big stator blades for world's largest wind tunnel cast by National Supply

When completed in 1955, the world's largest wind tunnel will be able to produce air speeds of more than 2,500 mph—the collective force of 25 hurricanes! It will be used for testing the aerodynamic characteristics of full-size jet engines, air-frames, and guided missiles.

National Supply—a logical source for this type of specialized equipment cast the steel stator blades which will have an important role in the operation of the tunnel. Each blade had to be designed to do a specific job. Our engineers developed the patterns for the intricate contours of spiral design with six stages of graduated thicknesses. Functioning in the same manner as slats in a venetian blind, these blades will control the tremendous volume of air flow produced by 5 giant compressors.

This precision work is typical of the many specialized jobs National can do through the completely integrated facilities of its Torrance plant. Whatever the need might be, National is equipped to serve western industry—in many and varied ways. Why not see for yourself how National Supply's Industrial Products Division can help you?



National shop supervisor holds one of the many patterns used to mold the cast steel stator blades.



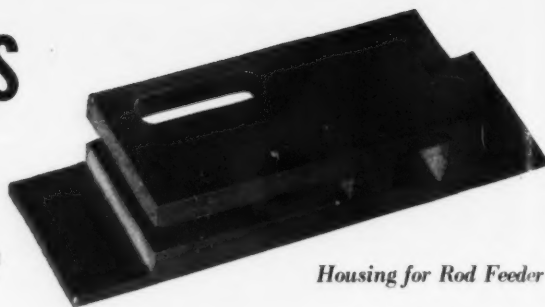
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THE NATIONAL SUPPLY COMPANY
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**ECONOMICALLY
TO CLOSE DIMENSIONS**



Housing for Rod Feeder



Internal Operating Lever

These two parts—vital to a starting-rod feeder for a hand-scarfing blowpipe—are produced in quantity by HAYNES precision-investment casting. Both parts are too intricate in shape for accurate production by conventional casting methods. And since they are made from stainless steel, the cost of machining the parts in quantity would be prohibitive.

HAYNES precision casting is an ideal method

for mass-producing parts that must be made from an alloy difficult to fabricate into intricate shapes by ordinary methods. Sound, smooth castings are produced to such close dimensional standards that the need for finishing operations is minimized. For more information on the types of parts best suited to this process, and for tips on designing parts to be cast by this method, write for the booklet, "Investment Castings."



The efficiency of the starting-rod feeder on this hand-scarfing blowpipe is partly due to the use of HAYNES investment castings for the critical parts of the assembly.

HAYNES
TRADE-MARK *alloys*

"Haynes" is a trade-mark of Union Carbide and Carbon Corporation.

Haynes Stellite Company

A Division of

Union Carbide and Carbon Corporation

UCC

General Offices and Works, Kokomo, Indiana

Sales Offices

Chicago — Cleveland — Detroit — Houston

Los Angeles — New York — San Francisco — Tulsa

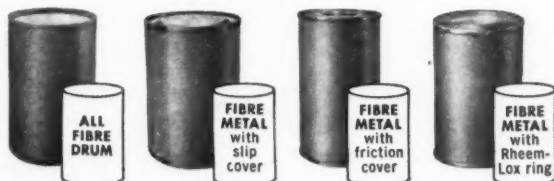
For more details circle No. 14 on Reader Service Postcard

FIBRE DRUMS? STEEL SHIPPING CONTAINERS? STEEL EQUIPMENT CONTAINERS?

RHEEM Announces a Complete Line of Fibre Drums to Provide an All-Inclusive Shipping Container Service

To supplement its line of steel shipping and custom equipment containers, Rheem has added a complete line of Fibre and Fibre-Metal drums. These strong, light weight, inexpensive drums come in four types and in a wide variety of sizes.

Choose the Drum that Fits Your Needs



Choose the type that best fits your needs — All-Fibre drums, or Fibre-Metal drums with steel bottoms with either slip or friction covers or with the new, easy to install and remove Rheem-Lox ring. Only Rheem offers all these types of low cost containers.



Choose the Size that Fits Your Needs

Choose the size that best fits your needs. Fibre drums from 1- to 32-gallons in capacity; Fibre-Metal drums from 5- to 60-gallons. There is virtually a size for every possible requirement.

RHEEM

MANUFACTURING COMPANY

Chicago 29, Illinois New Orleans 20, La. Seattle, Washington
Houston 20, Texas New York 22, New York South Gate, California
Linden, New Jersey Richmond 4, California Sparrows Point 19, Md.
Export Sales, 477 Madison Avenue, New York 22, New York

Foreign Affiliates and Associates: Argentina—Buenos Aires • Australia—Adelaide, Brisbane, Fremantle, Melbourne and Sydney • Brazil—Rio de Janeiro • Canada—Hamilton • Italy—Milan • Peru—Lima • Philippine Islands—Manila • Singapore • Spain—Madrid • United Kingdom—Bristol.

NOW, More than ever before, You Can Rely On for all your shipping container requirements



For more details circle No. 15 on Reader Service Postcard

September, 1954 — WESTERN INDUSTRY

GET THEM ALL... GET THEM FAST... from RHEEM

RHEEM STEEL CONTAINERS ARE MADE IN SEVEN STRATEGIC LOCATIONS



Rheem Fibre Drums are being manufactured in four of these plants. Production lines are scheduled for installation in other plants soon.



30 gal. Rheem Fibre-Metal Drum

55 gal. Rheemcote Steel Drum

"FAMILY" IDENTIFICATION

Rheem can furnish on Fibre drums the same type of decorative service it provides users of Rheemcote lithographed steel drums. Any design or trade mark can be reproduced on an all-over label for Fibre drums in any number of colors to provide "family" identification for your products.

MAIL COUPON NOW!

RHEEM MANUFACTURING COMPANY

(Mail to Nearest Sales Office, Listed at Left)

- ☐ We would like to have your packaging engineers come to our plant and study our shipping container problems.
☐ Please send additional information.

NAME OF COMPANY _____

STREET _____

CITY _____ ZONE _____ STATE _____

BY _____

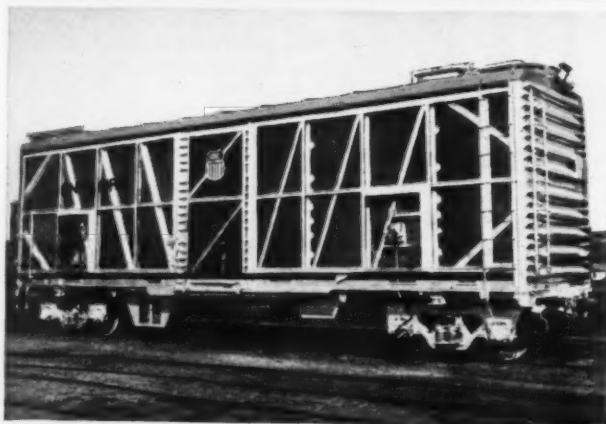
*Good containers, loaded right,
Insure delivery sound and bright.
Packing and loading is in our line
Shippers say "Results are fine."*



For several years, Union Pacific has employed a staff of packaging specialists who have worked closely with shippers, giving them the benefit of expert advice in scientific, protective packaging, crating and loading.

Early this year, the railroad introduced a "Perfect Shipping Progress Train," manned by experts, for physical demonstration of proved packaging and loading methods that reduce possibility of damage. This train made an exhibition tour along the U. P. mainline.

As a result of these and other progressive steps, the U. P. has built an enviable record for safe, dependable transportation of freight.



UNION PACIFIC RAILROAD

(Offices in 70 cities throughout U. S. A.)

For more details circle No. 16 on Reader Service Postcard

Now you can stop hydraulic failures before they stop you

Listed below are the four major causes of hydraulic failure. Check them and see how Shell Tellus Oil is specially designed to stop them before they cost you money



Sludge build-up. Shell Tellus Oil's special *inhibitor* actually stops oxidation (major cause of sludge) even under low operating temperatures



Lacquer build-up. Shell Tellus Oil's unique *cleansing properties* keep lacquer formation down . . . help keep hydraulic action smooth



Foaming. Shell Tellus Oil's special *foam inhibitor*, plus careful selection of base oil, prevent oil loss due to foaming



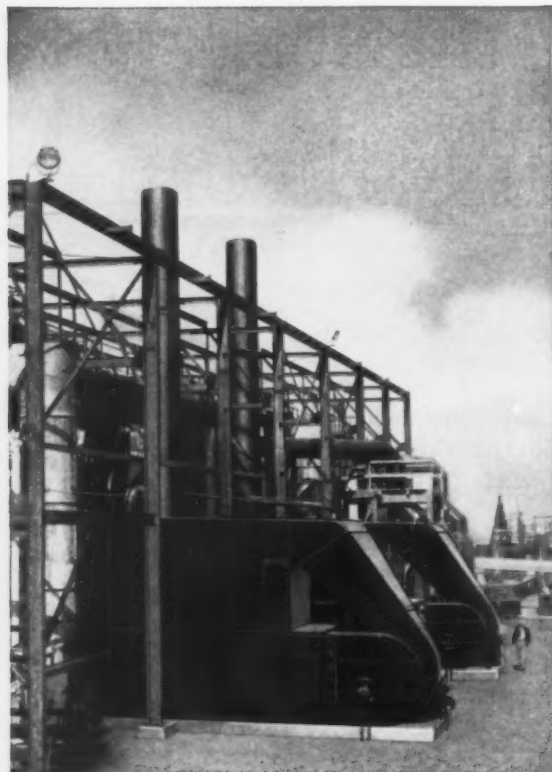
Abrasive rust. Shell Tellus Oil's patented formula containing *rust inhibitor* stops progressive rust—even when hydraulic parts are exposed to salt water

These factors make **SHELL TELLUS OIL** fine for all your machine tools and vital motor bearings, too. Try it next time they're due for oiling



For more details circle No. 17 on Reader Service Postcard

How to get rid of industrial fumes



American Blower Fans help get rid of fumes in this catalytic fume disposal installation at a modern chemical plant.

Revolutionary, new Catalytic Combustion process uses American Blower Fans to help convert hazardous industrial fumes to odor-free, color-free gases

An ingenious, low-temperature oxidation process developed by the Catalytic Combustion Corporation, Detroit, Michigan, uses American Blower Fans to help convert organic industrial fumes into odorless, colorless (and harmless!) gases — plus useful heat energy.

The secret of this fume-destroying system is the Suter-Ruff Catalytic Element: a closely packed mat of heat- and corrosion-resistant metallic ribbons, coated with platinum alloy, and conditioned to produce catalytic action.

Catalytic Combustion occurs when burnable fumes are passed through this catalytic element. Fume destruction is complete, whether fumes are present in traces or heavy concentrations.

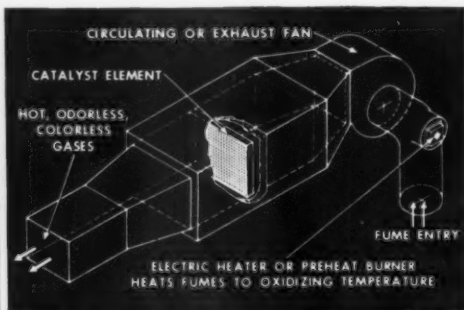
Good velocity and distribution of fumes through the mat is a *must* for effective use of the entire catalyst area. Catalytic Combustion Corporation relies on American Blower Fans in its installations to do this important job; they've found that American Blower Fans are efficient, long lived, quiet in operation.

If you have an air-handling problem, feel free to call on American Blower engineers—any time. Just phone your nearest American Blower or Canadian Sirocco Branch Office.



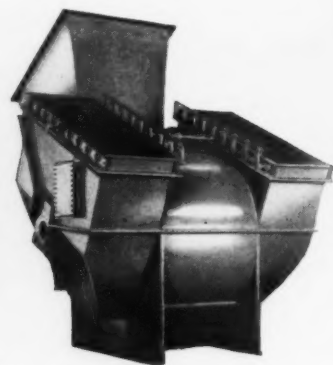
Suter-Ruff Catalytic Element

Small in size, the Suter-Ruff Catalytic Element is capable of handling large volume. During fume oxidation, temperatures jump as much as 600° F.—furnishing heat that may be utilized in manufacturing.



The Catalytic Combustion Process

For catalysis to take place, fumes must be preheated with an electric heater or preheat burner. American Blower fans provide the needed mixing, circulation and exhaust of fumes at elevated temperatures. Catalytic Combustion eliminates fire hazards, condensate in ducts, air pollution.



Sirocco Induced Draft Fan

American Blower Fans are used extensively for forced and induced draft, ventilating, air conditioning, drying, fume removal, and processing systems. Write to us for Literature on our complete line of products.

AMERICAN BLOWER CORPORATION, DETROIT 32, MICHIGAN • CANADIAN SIROCCO COMPANY, LTD., WINDSOR, ONTARIO
Division of American Radiator & Standard Sanitary Corporation

**YOUR BEST
BUY**

AMERICAN



BLOWER

**AIR HANDLING
EQUIPMENT**

Serving home and industry: AMERICAN-STANDARD • AMERICAN BLOWER • CHURCH SEATS & WALL TILE • DETROIT CONTROLS • KEWANEE BOILERS • ROSS EXCHANGERS • SUMMEAM AIR CONDITIONERS

For more details circle No. 18 on Reader Service Postcard



"UNOBA more than doubles the life of these bearings."



Joseph M. Alvaro,
in charge of closing machine maintenance,
Bercut-Richards Packing Co., Sacramento, Calif.

"We used to figure on changing the roller bearings on the can holding chucks every season... sometimes twice.

"Now with UNOBA F1 to lubricate our seamer rolls we've found a grease that more than doubles the life of these bearings.

"As every packer knows, fruit acids, especially tomato, steam and salt, are tough on canning machinery. However, the UNOBA-protected bear-

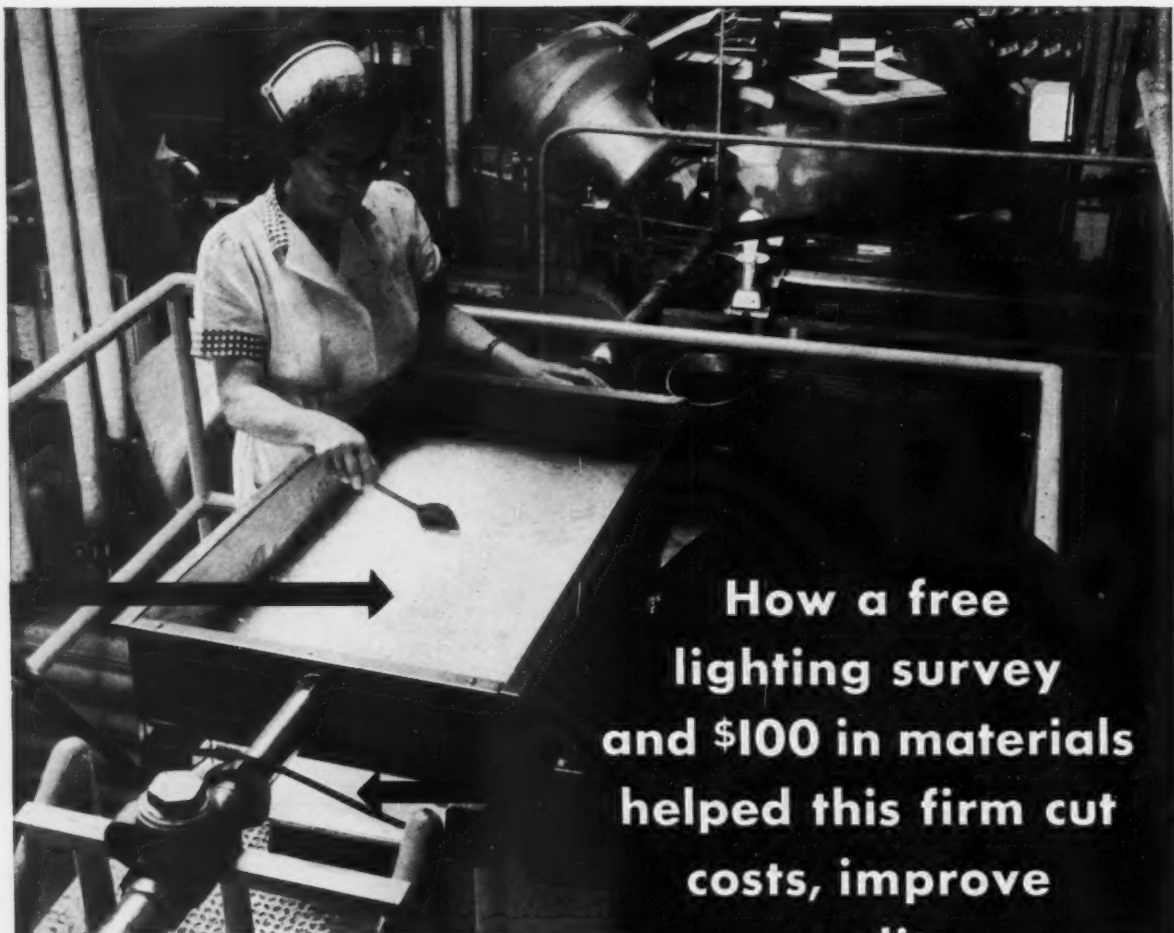
ings on this seamer are now into their second season with no apparent signs of wear. In all my 30 years of experience I've never found a better grease for all-around cannery use than Union Oil's UNOBA."

UNOBA, a new and improved grease that resists steam, water, salt, heat and acids, is now immediately available from your nearby Union Oil representative.

UNION OIL COMPANY 76
OF CALIFORNIA

Los Angeles: Union Oil Bldg. • New York: 45 Rockefeller Plaza • Chicago: 1612 Bankers Bldg. • New Orleans: 644 National Bank of Commerce Bldg. • Atlanta: 401 Atlanta National Bldg. • Kansas City, Mo.: 921 Rialto Bldg.

For more details circle No. 19 on Reader Service Postcard



**How a free
lighting survey
and \$100 in materials
helped this firm cut
costs, improve
quality**

*Planned lighting can possibly
give you the same good results*

The Tea Garden Products Company, of San Leandro, Calif., for many years inspected its preserves and jellies by passing them over a stainless steel table under high levels of overhead lighting. But this had a serious drawback: light reflected into the eyes of the inspectors, making close inspection difficult.

After a survey, P. G. and E. lighting engineers recommended a translucent table with lamps beneath a glass panel, as shown above. Now the preserves and jellies are clearly

silhouetted against a luminous background. Result: one inspector easily does the work of several. Cost: only \$100...for materials. The lighting survey was free.

Your business may be entirely different from Tea Garden's. But chances are, a correct seeing environment can also help raise the output and the quality of the work of your employees. It costs you nothing to find out. So let a P. G. and E. lighting engineer make a survey for you soon.

*For free planned lighting advice, call your nearest
P. G. and E. office today*



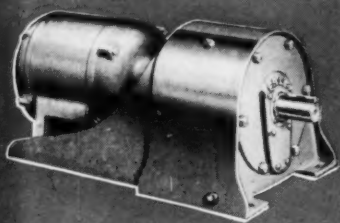
405-X-354

many types, sizes, styles, arrangements...

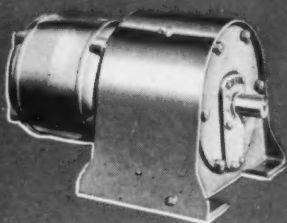
ALL-STEEL

FALK Motoreducers

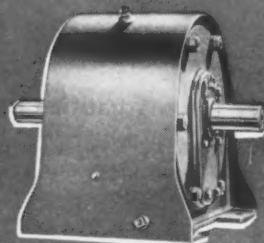
cover the entire application range



Type EZ, All-Motor Horizontal Motoreducer. Accommodates any make or type of foot-mounted motor.



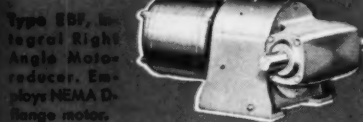
Type EF, Integral Horizontal Motoreducer. Standard NEMA D-flange motor mounts directly on Motoreducer housing.



Type EC, Concentric Shaft Speed Reducer. Coupling, chain or belt driven.

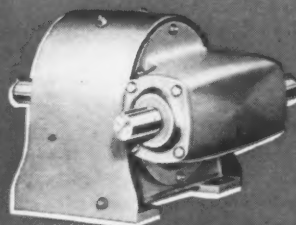


Type EBZ, All-Motor Right Angle Motoreducer. Any output shaft position (see below, right).



Type EBF, Integral Right Angle Motoreducer. Employs NEMA D-flange motor.

IMMEDIATE DELIVERY
...from West Coast Stock
Units and spare parts in Factory Stock at
Oakland, California and Portland, Oregon.
Authorized stocking Falk Distributors
throughout the West.



Type ECB, Right Angle Speed Reducer. Any output shaft position; coupling, chain or belt driven.

VERSATILE MEMBERS OF A DISTINGUISHED FAMILY

The name FALK on a reducing unit of any size or type is your positive guarantee of highest quality, value and efficient performance with minimum maintenance throughout its long life.

All-steel FALK Motoreducers—both the All-Motor and Integral types—are available in horizontal and vertical models with double, triple or quadruple reduction; concentric and right-angle shaft arrangements. They cover a surprisingly wide range in horsepower and in output speeds. Every FALK Motoreducer is built and rated according to AGMA standards.

Whatever your reduction requirements—be they simple, complex or "different"—it is just good business to consult FALK, recognized leader in the Motoreducer and speed reducer field. Write to Department 247.

Every FALK Motoreducer has these "IN-BUILT" Factors

All-steel Housings. Unbreakable, strong, rigid. Generous overhung load capacities provided by wide bearing spans, large shafts and bearings.

Precision Gearing. Heat-treated alloy steel, precision cut and shaved helical gearing throughout . . . quiet-operating crown shaved pinions . . . taper bored gears for easy ratio changes.

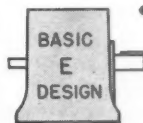
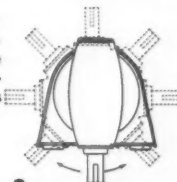
Sealed Housings. Dual closures and one-way vents keep oil in, dust and moisture out. Units are splashproof, leakproof, dustproof.

Wide Speed Range. Selective ratio combinations provide output speeds from 1.5 rpm to 1430 rpm with stock gears.

Streamlined Inside and outside. Smooth, clean surfaces; machine welded construction conforms to NEMA motor frames.

Positive Lubrication. Large sump capacity . . . oil-tight construction assures clean lubricant . . . direct dip of revolving elements provides positive lubrication at all speeds.

Any Output Shaft Arrangement (on Right Angle models). Shafts can be furnished in horizontal, vertical or angle position as shown in sketch at right.



EC

The basic E design permits maximum use of standardized parts . . . closer control over materials, processing, inspection and assembly . . . resulting in faster delivery from interchangeable stocked assemblies.



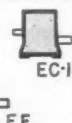
EZ



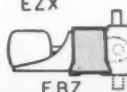
EFX



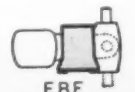
EF



EC-1



EBZ



EBF



ECB

FALK

...a good name
in industry

THE FALK CORPORATION, 3001 W. Canal St., Milwaukee 8, Wis.

For more details circle No. 21 on Reader Service Postcard

WRITE TO DEPARTMENT 247

Trade show facilities needed

BETTER FACILITIES are badly needed in the West for industrial and trade shows, and it seems that industry should be shouldering some of the responsibility, if not part of the financing also. Perhaps trade associations or technical societies could buy stock in corporations organized to construct suitable auditoriums or display pavilions.

As Western industrial activity increases, this need will become more acute. The very fact that Los Angeles is to have (whether accidentally or deliberately) two very similar shows within ten days of each other next March is a good indication of the growing number of such affairs that we may expect in the future. Eastern shows simply do not reach enough of the Western buying power to satisfy industry's needs.

Consider the facilities Los Angeles offers for these two affairs. The first, the American Society of Tool Engineers' first "Western Industrial Exposition," is to be held at Shrine Auditorium, fairly close (as Los Angeles distances go) to downtown hotels. It has a large auditorium and smaller conference rooms, but inadequate display space. Despite the opening up of a long unused basement, it will never be the one-floor exhibit structure required to put exhibitors on a basis of equality.

Pan-Pacific Auditorium, where the American Society for Metals has its biennial Western exposition ten days later, is all on one floor and has plenty of surrounding space for expansion, but no meeting rooms for conferences. A bigger handicap yet is the fact that it is miles from the main hotels of Los Angeles.

San Francisco has the Civic Auditorium, convenient to hotels, but already too small and impossible to enlarge, at least on one floor. A bond issue to be voted on in November may relieve the situation. Seattle, Portland, San Diego, and Denver have not had as yet to face the problem in as great a degree, but their day will come.

Consultants needed

THE WEST COULD USE more specialized consultants, provided, of course, that they know well enough how to sell their services.

Industrial packaging is a good example. A seminar held in connection with last month's packaging and materials handling show in San Francisco revealed the fact that information regarding performance and properties of fiber cartons, transparent wraps, and bags is woefully scanty. Many users would welcome help on problems that now cost them large sums of money.

Admittedly the West has not been too receptive to some lines of consultants in the past, but industrial needs are bringing nearer the need for people who have specialized information. General management consultants have done a fine job in the West to date on some of the basic questions, but further specialization is needed.

Management's responsibility

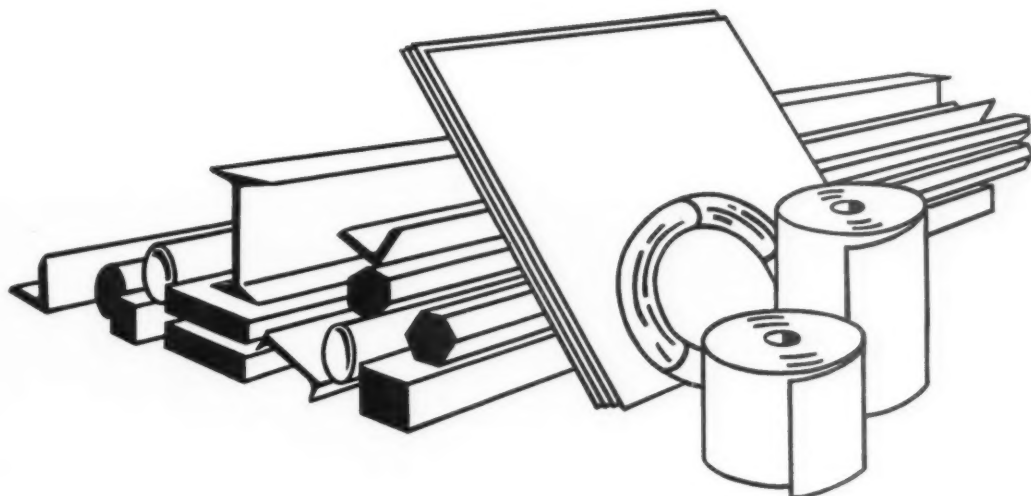
THE North American continent is the only place where the people still trust private management to operate the national economy. Col. Alexander R. Heron, vice-president of Crown-Zellerbach Corp., recently pointed this out to the California Personnel Management Assn., with the warning that if it failed to supply an adequate number of jobs, it would be superseded by the state.

Two unhappy exceptions to private management in the United States were cited. First, when it failed to provide an adequate number of jobs during the depression and government management "stepped in and did a very bad job, but did supply jobs of a kind." Second, when it failed to supply enough low-cost housing for millions of Americans, and to a large extent has been shouldered out of the business of providing and owning the low-cost housing which a large number of our people need.

As the only way in the world by which any job ever has been created is by selling the product of that job to a willing customer, management's responsibility, in his opinion, is to sell the services of 60,000,000 American workers in the form of goods and services to people who want to buy them. Having done that selling, the jobs have been created and the purchasing power has been created and distributed to pay for the sales.

His reasoning is good, provided that the workers also realize that this is the means by which their jobs are created.

STEEL



call us for

BARS • SHAPES • PLATES • SHEETS
STRUCTURALS • STRIP • TUBING
COLD DRAWN BARS • PIPE
FLOOR PLATE

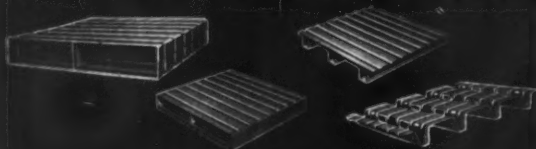
HOWARD

SUPPLY COMPANY

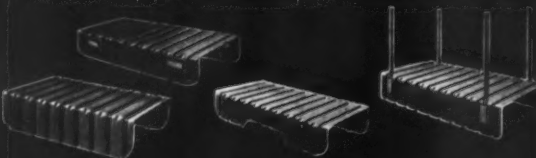
5125 SANTA FE AVENUE, LOS ANGELES • KIMBALL 1281

For more details circle No. 22 on Reader Service Postcard

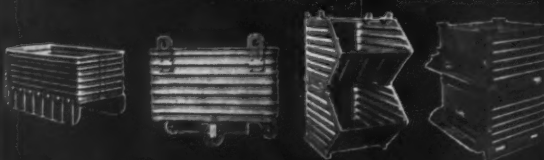
For All-Steel Pallets



For All-Steel Platforms



For All-Steel Boxes



For Special Equipment



CONTACT

POWELL

BEFORE YOU BUY

*ORIGINATORS AND LEADING MANUFACTURERS OF ALL-STEEL COLD FORMED MATERIALS HANDLING EQUIPMENT
HUBBARD, OHIO (IN GREATER YOUNGSTOWN)



WEST COAST REPRESENTATIVES

IRA G. PERIN CO. SAN FRANCISCO
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AIR MACK, INC. of WASHINGTON
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— PORTLAND

For more details circle No. 23 on Reader Service Postcard

LETTERS

Contributions to this column from our readers are welcome. Names will be withheld from publication if requested. Unsigned letters will be disregarded.

Inquiries gratify

Editor, WESTERN INDUSTRY:

Thank you very much for the additional industrial inquiries which came to you as a result of your news story about our industrial brochure.

R. L. SHIRLEY

Manager

Fairfield-Suisun Chamber of Commerce and Agriculture
Fairfield, Calif.

Executive help

Editor, WESTERN INDUSTRY:

We would appreciate receiving two tearsheets, if available, of the article "How To Choose Your Next Executive and Get the Man You Want" that was published in the May 1954 issue of WESTERN INDUSTRY.

L. J. ROCKWELL

Treasurer

Arrow Transportation Co.
Portland, Ore.

Coal commentary

Editor, WESTERN INDUSTRY:

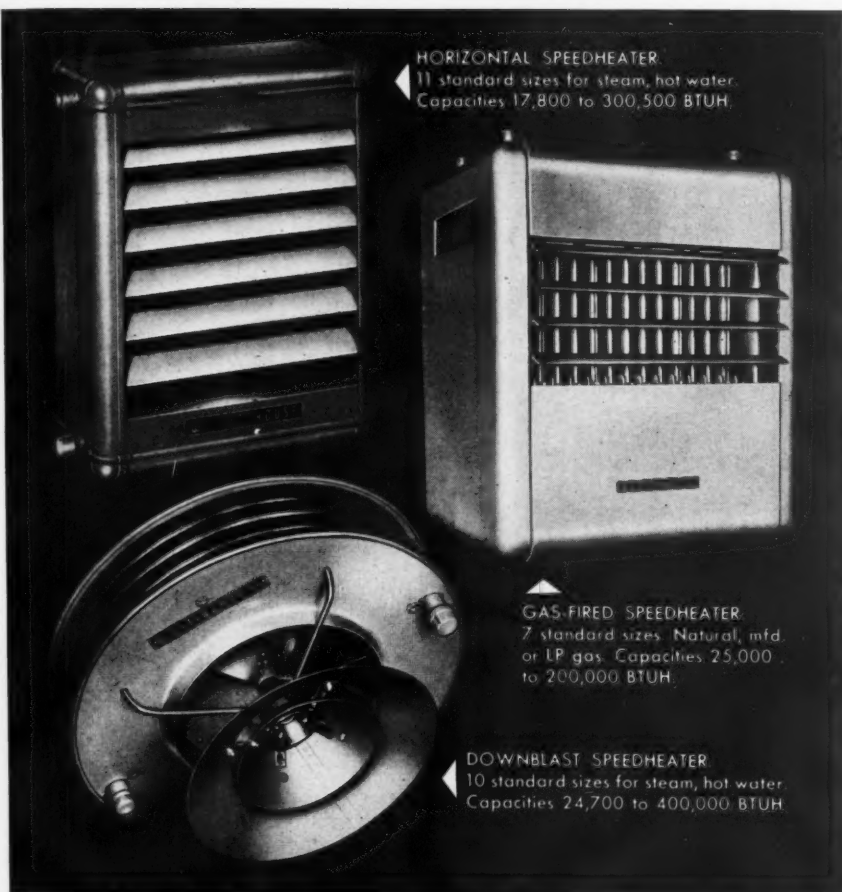
The ideas expressed in the editorial "It Doesn't Have To Be Poor" are thought-provoking and have considerable merit. Certainly the coal deposits of the West are a great natural resource which should be wisely utilized for the greatest public good. It is also true that too little fundamental information is available relative to coal. These same statements could also be made with respect to other natural resources of the West, some of which are of strategic importance. We will ultimately need all energy sources in the West as well as all other natural resources. The problem which constantly faces universities and other agencies engaged in fundamental research relative to resources is the order of priority. This in turn is to a great extent controlled by public opinion, the wishes of the citizens of any state, because they must be willing to pay the bill.

Joint or cooperative research projects as suggested in this editorial are feasible. The establishment of a Coal Research Institute in the West, jointly supported by the Western states, might also be feasible. Much has been done since World War II relative to fundamental research on coal by the National Coal Association, especially by the Bituminous Coal Institute, a department of the National Coal Association. Many large industries such as Union Carbide & Carbon Co. are cooperating in this research program. To what extent Western universities should enter this program jointly, and at this time, would require considerable study and the resolution of many complex problems. Perhaps this matter should be a subject of discussion for the Western Governors' Conference.

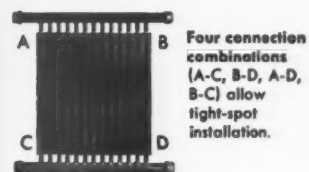
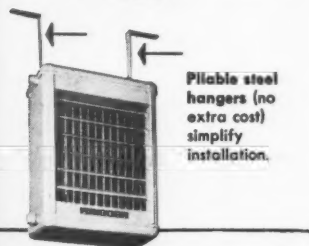
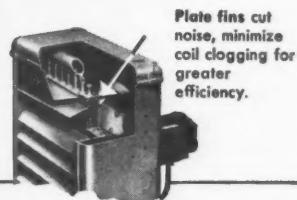
J. P. SPIELMAN

Dean

School of Mines
State College of Washington
Pullman, Wash.



CHECK THESE WESTINGHOUSE HORIZONTAL SPEEDHEATER SPECIALS!



The traditional value in unit heaters— **WESTINGHOUSE SPEEDHEATERS®** for instant heat... quiet heat... low-cost heat

Built for strength, built for style, built to install easily and satisfy for years.

For today's outstanding heating value, look to a pioneer name in unit heaters—look to Westinghouse Speedheaters! Check, before you specify, all the features that add up to traditional Speedheater superiority:

- (1) **instant heat**—generated at the flip of a switch, and all of it effective heat because the Speedheater one-row, plate-fin heating element assures most efficient heat flow;
- (2) **quiet heat**—the Speedheater, always known for silent operation, is quieter than ever! Aluminum plate fins, mechanically bonded, cut noise... rugged, welded construction eliminates rattles... powerful die-formed fans send heat where it's needed, do it *quietly*;
- (3) **low-cost heat**—heat that saves dollars on fuel (up

to 25% savings in present installations over old-style systems), more dollars in pure-and-simple efficiency in heating spots or large zones, in supplementing central systems in any required pattern.

Check other Speedheater values, too: the pliable steel hanger straps and flexible connection combinations (see cuts) that simplify Horizontal model installation... the multiple-cone diffusers on Downblast model that give positive heat control, especially desirable for buildings with high ceilings... the all-purpose AGA-approved Gas-Fired model that eliminates the need for central system heating. For full information call your Westinghouse-Sturtevant heating specialist now. Or write: Westinghouse Electric Corporation, Sturtevant Division, Hyde Park, Boston 36, Massachusetts.

prompt shipment—These Speedheaters are available for immediate shipment from our Pacific Coast Plant at Berkeley, California.

Sturtevant Division offices at: Los Angeles, California; San Francisco, California; Portland, Oregon; Seattle, Washington. Pacific Coast Plant: Berkeley, California.

WESTINGHOUSE AIR HANDLING

YOU CAN BE SURE... IF IT'S **Westinghouse**

For more details circle No. 24 on Reader Service Postcard



Chain and Attachments for your every need

• Your own experience has shown you the vital importance of selecting exactly the right chain and attachments for each specific end use. AMERICAN makes all basic chain patterns so that you can get from one manufacturing source the best and most economical chain for your every requirement.

Whether you need chain for general service, for heavy (or light) duty, for logging, or for some unusual application—you can count on AMERICAN CHAIN every time! Welded chain or weldless chain—you'll find the same high quality in both. Also, a complete line of AMERICAN-made attachments for any type or size of chain.

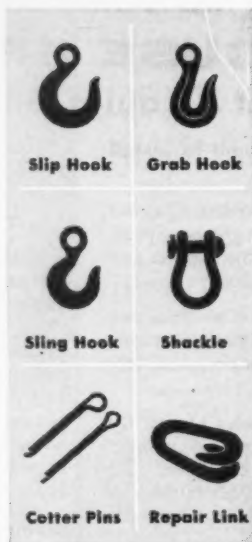
Call your AMERICAN CHAIN distributor. He stocks many popular chains and will gladly advise you on your needs. Or—write our York office. **DENVER OFFICE • 4555 East 46th Avenue**
LOS ANGELES OFFICE • 2216 South Garfield Avenue
SAN FRANCISCO OFFICE • 890 Tennessee Street



American Chain Division AMERICAN CHAIN & CABLE

York, Pa., Chicago, Denver, Detroit, Houston, Los Angeles, New York, Philadelphia, Pittsburgh, Portland, Oregon, San Francisco, Bridgeport, Conn.

For more details circle No. 25 on Reader Service Postcard



CALENDAR OF MEETINGS

SEPT. 20-21—*Pacific Northwest Industrial Health Conference*, Multnomah Hotel, Portland. Contact conference headquarters, 824 S. W. 5th Ave., Portland.

SEPT. 20-23—*American Mining Congress* national conference, San Francisco. Contact J. D. Conover, secretary, Ring Bldg., Washington 6, D. C.

SEPT. 27-29—*American Society of Mechanical Engineers*, Petroleum Mechanical Engineering Conference, Hotel Statler, Los Angeles. Contact L. F. Strader, 735 E. Roosevelt Blvd., Long Beach, Calif.

OCT. 6-8—*Edison Electric Institute*, Hotel Sir Francis Drake, San Francisco. Contact C. Baugh, Pacific Gas & Electric Co., 245 Market St., San Francisco.

OCT. 8—*Washington Assn. of Operating Millers*, state meeting, Davenport Hotel, Spokane, Wash. Contact W. W. Liley, 1211 E. Sprague Ave., Spokane.

OCT. 10-12—*Pacific Northwest Trade Assn.*, conference, Wenatchee, Wash. Contact D. C. Knapp, executive secretary, 1217-1218 Joseph Vance Bldg., Seattle 1.

OCT. 10-13—*American Assn. of Oilwell Drilling Contractors*, Los Angeles chapter convention, Biltmore Hotel, Los Angeles. Contact S. I. Williams, Los Angeles, MADison 9-1681.

OCT. 15-16—*Calif. Manufacturers Assn.*, Mark Hopkins Hotel, San Francisco. Contact Association office, Mills Bldg., S. F.

OCT. 25-26—*Forest Products Research Society*, Pacific Northwest section, Corvallis, Ore.

OCT. 25-27—*National Lubricating Grease Inst.*, San Francisco. Contact H. F. Bennetts, executive secretary, 4638 J. C. Nichols Parkway, Kansas City 12, Mo.

OCT. 28-30—*American Institute of Mining & Metallurgical Engineers*, Rocky Mountain Region Industrial Minerals Conference, Salt Lake City. Contact W. F. Rappold, General Refractories Co., 521 Atlas Bldg., 36½ W. Second South St., Salt Lake City.

NOV. 17—*Western Area Development Conference*, Mark Hopkins Hotel, San Francisco. Contact C. L. Hamman, Stanford Research Inst., Palo Alto, Calif.

NOV. 18-19—*Nat. Assn. of Corrosion Engineers*, Western Region, conference, Hotel Biltmore, Los Angeles. Contact J. G. Kerr, C. F. Braun & Co., 1000 S. Fremont Ave., Alhambra, Calif.

DEC. 3-4—*Northwest Mining Assn.*, Davenport Hotel, Spokane, Wash. Contact Association, MA 4822, Spokane.

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ABOVE: Applying Rust-Oleum 769 Damp-Proof Red Primer Over Rusted Surface After Scraping and Wire-Brushing to Remove Rust Scale and Loose Rust.

AT RIGHT: Applying Rust-Oleum Gray (One of Many Rust-Oleum Colors for Rust Prevention and Decorative Beauty).



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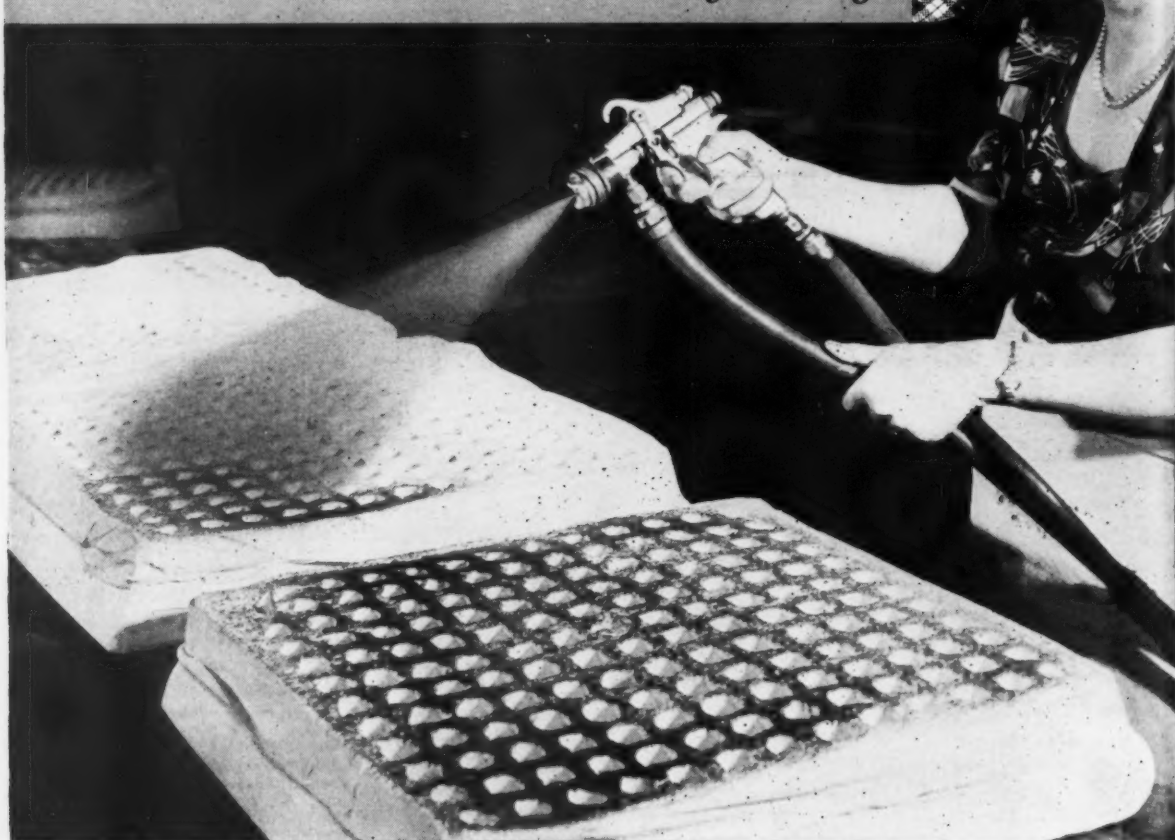
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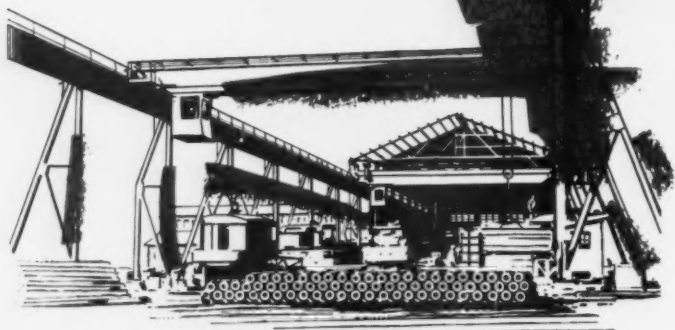
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September, 1954 — WESTERN INDUSTRY

539 DEPT. 140

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THIS MONTH'S COVER

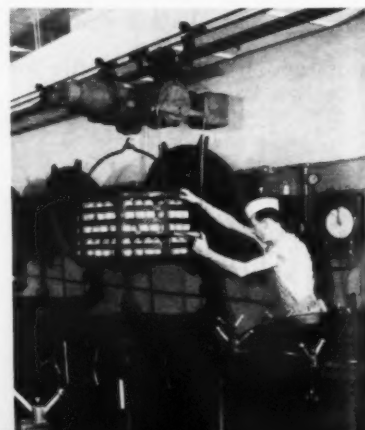
FARMERS' CO-OP pays off

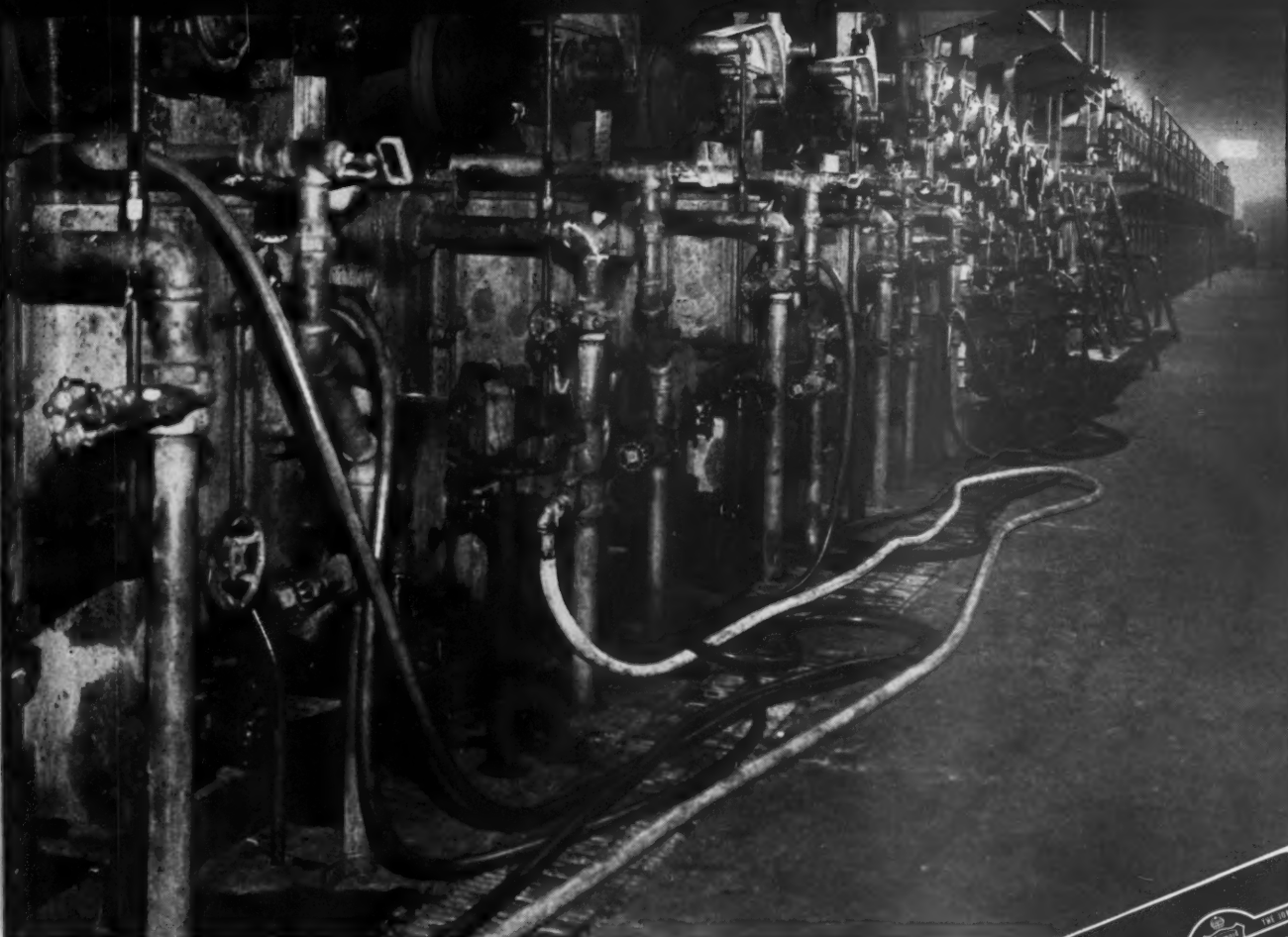
Farm families, interested in getting fair compensation for their products as well as providing quality products at prices fair to the consumer, have long had organizational problems. The farmers of Washington state felt an acute need for an organization to help attain these objectives and at the same time compete with highly organized labor and industry. So in 1917 they formed the Washington Co-Operative Farmers' Assn. to provide a variety of services difficult for an individual member to negotiate.

All returns above the actual costs of doing business are returned on a patronage basis to the 35,000 farm families who own the association. The group markets eggs, poultry, turkeys, and seed produced on members' farms. Through the co-operative, members have been able to produce a higher quality and better graded product. Markets have been enlarged and brands promoted widely.

The co-operative has also made possible more sanitary plants, better working conditions, better materials handling, a higher degree of standardization of product, and improved transportation and sales facilities. The Washington Co-Operative Farmers' Assn. in its 37 years of operation has become every year a more important part of the state's Inland Empire, and with the advent of more water, more hydro-electric power, and natural gas is likely to become an even more important participant in the West's growth.

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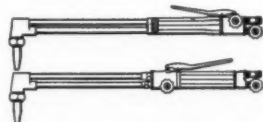
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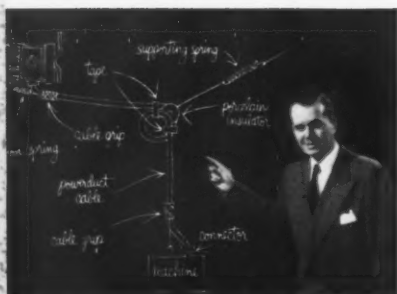
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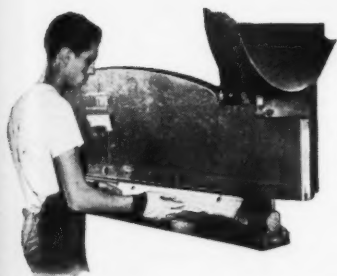
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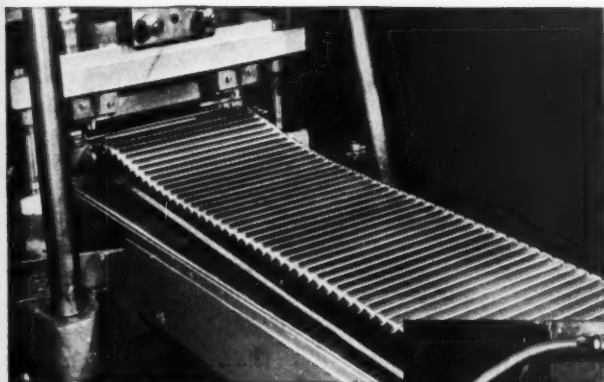
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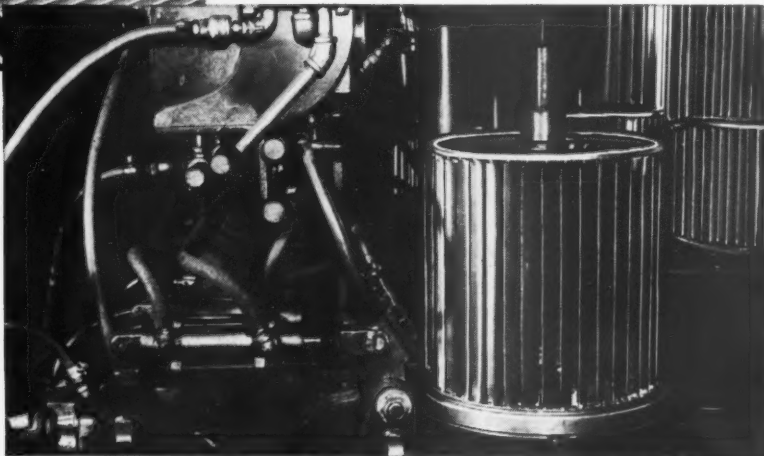


Utility Appliance Corp. makes evaporative coolers from USS Steel Sheets



Making corner posts for evaporative coolers out of 22 gauge galvanized steel (see photo above left) is a five-step operation at Utility Appliance Corp., Los Angeles, Calif. A 90-ton V&O punches out blades for blower wheels (left) from a continuous coil of 20 gauge cold rolled strip. At full capacity, this plant produces approximately 5000 coolers per week in several different sizes, also makes water heaters, furnaces, heavy duty blowers and modern gas ranges to suit a variety of applications.

Spot welding of blower wheels is done on this semi-automatic set-up designed by Utility Appliance Corp. The ends of blower wheels are 18 gauge cold rolled sheet; blades are 20 gauge strip. This company reports: "We like USS Steel Sheets because they're always uniform high quality ...with perfect temper and gauge. In addition, we get good service and dependable delivery."



Mr. Tom Northcote, Sales Manager of the Cooler Division of Utility Appliance Corp., inspects one of the completed Utility Air Coolers. The finished product is just one of many examples of United States Steel at work. From start to finish...from open hearth to rolling mill to final product...steel from USS is designed to do the best job for you. For full information or technical assistance, contact your nearest Columbia-Geneva District Sales office.

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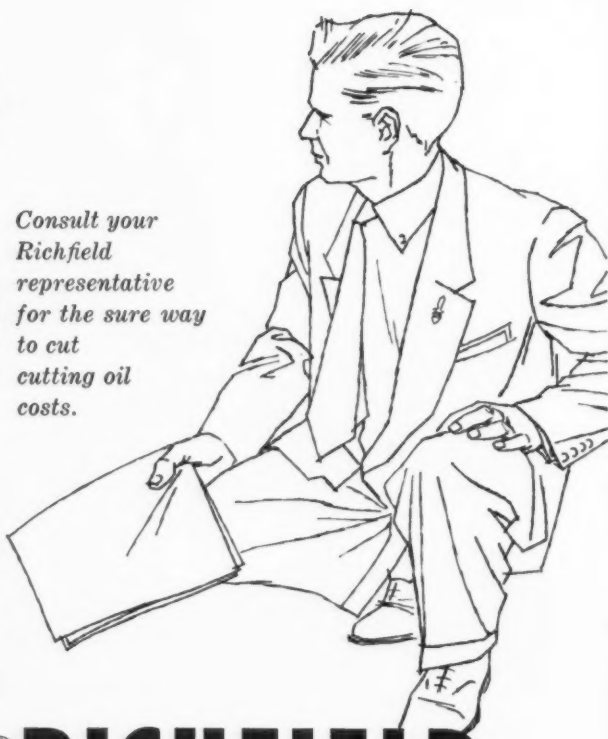
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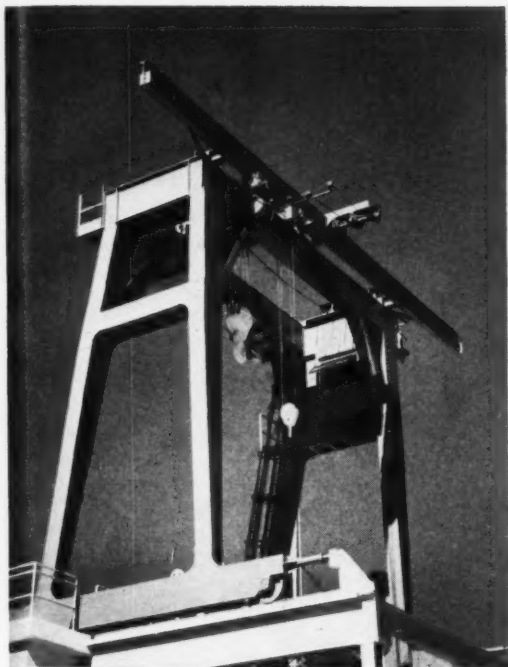
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Why settle for less than a "plant individualized" crane? Write TODAY for 32-page booklet showing MOFFETT crane installations. Also for our Crane Inquiry Form, listing factors you need to consider in preparing your crane specifications. No obligation. Phone, wire or write NOW.



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PROVIDES SURE FOOTING

SAFETY PLATE...*quick delivery*

The next time you're looking for an answer to an under-foot problem where sure traction, easy maintenance and long wear are important, call Ryerson for Inland 4-Way Safety Plate.

The lugs in this attractive Inland pattern are hot rolled at right angles to each other to provide safe footing in all directions. There are no pockets where liquid or dirt can collect, so the surface is easy to drain and sweep.

This firesafe, long-lasting plate is available in two pattern sizes and a wide range of thicknesses. You can order it sheared, bent

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A safety program that paid off

A 65% reduction in plant accident frequency in a three-year period is an impressive record. The personnel of General Foods Corp., whose safety training program achieved this result in 1948, were understandably pleased when 14 of their plants received National Safety Council awards that year.

In 1949, under the guidance of Couch Wallace, personnel assistant, the Birds Eye Western Region plants started their extensive campaign and brought the regional accident index down 59%.

What most impressed management and employees, though, was not merely the success they had already achieved. It was the challenge of expanding the program to keep pace with the company's growth. GF went ahead, and by 1952 the plant accident rate had been lowered by 80%, with a lost-time frequency of 4.4.

A year later — 1953 — a group of five General Foods plants in New Jersey had a combined accident frequency rate of only 2.1 lost-time accidents per million manhours worked. And the governor's safety award for the state of Washington in 1953 went to the Birds Eye Yakima plant for

having racked up 700 consecutive Safe-Days—days worked without a single lost-time accident.

How did GF accomplish this outstanding record? An old slogan gives the answer: "Safety Is No Accident."

In fact, a safety campaign has to be carefully planned and carried on unrelentingly. Birds Eye Personnel Manager C. E. Miller at Hillsboro, Ore., is frank to admit that "gimmicks"—the refinements of a safety campaign—are of only incidental importance. A safety program that pays

off, he says, has to be built up from a solid foundation.

The basic principles of all GF safety programs are: (1) a desire to maintain safe plants and reduce injuries; (2) acceptance of accident *prevention* as an operating responsibility; and (3) delegation of safety responsibility to line managers.

Company-wide observance of these basic principles has provided a flexible setup that meets the needs of GF's decentralized operations. In practice, the safety committee system makes

Essentials of the General Foods safety program

1. A statement of principles establishing safety as a highly important operating responsibility.
 2. An accident prevention training course for all supervisory personnel.
 3. An organization for handling all matters pertaining to safety.
 4. A system of observing and recording accident data on a continuing basis.
 5. Effective two-way communications on safety recommendations and actions.
 6. A program of at least one year's duration to spark and maintain a high level of interest in safety.
- (And then, of course, the program must keep going and growing.)

every worker, from top managers right on down, an active participant in the program. As a consequence of the program, GF people have learned what protects *their* safety—it is working with the safety committee, whose members are their foremen, their supervisors, and themselves. Under a successful program, the safety experts are always on the job.

This last fact is actually the crux of the safety problem. The administration and organization of the whole program stems from it and has it as its final objective. There's a good statistical reason why this should be so, too. Only 20% of accidents are caused by unsafe conditions; 80%—four times as many—are the result of unsafe acts. Housekeeping is a secondary target for an effective program.

"Line" responsibility

The plant survey that mapped out unsafe acts of workers as the theater of safety operations was carried out under instructions from A. L. Reiling, Western production manager. At a production conference soon after, he directed each plant manager to assume as much "line" responsibility for *safety* as he does for quality production, low cost operation, and high employee morale. As the first safety operational step, he announced a training program with two principal aims: first, to help supervisors recognize their responsibility; second, to improve communications about safety to plant employees.

A regional safety committee (Manager Reiling and his staff) keeps

Slogans that slug

Slogan contests stimulate interest in GF's accident-prevention program. Members of the safety team—and that includes everybody who works for any GF plant or warehouse—won tickets to sporting events, half-days off, and cash prizes for these slogans which were used in the safety campaign:

- Keep Your Mind On Your Work and You'll Keep Your Fingers On Your Hands
- A Crutch May Support You—But It Won't Support Your Family
- Be Careful — Remember, There Are No Spare Parts For the Human Body
- Work To Be Skilled—Not To Be Killed
- An Ounce of Prevention Is Worth a Pound of Bandages

abreast of the progress in each plant by means of reports sent in every month by the plant steering committees. This procedure keeps every plant moving toward a common goal. At

the same time, safety procedures are sure to fit the *local* needs at each plant. They always remain geared to local conditions, even while conditions are bettering.

The heart of the program, clearly, is training. At the beginning of GF's over-all program, the immediate need was for capable instruction in safe operating procedures. GF's training division set out on a course of "training the trainees." A five-day Accident Prevention Institute was attended by representatives from the plants. Western region plants developed an adaptation of the Institute to fit their own needs.

Program

The modified program, attended at the outset by 18 plant conference leaders, centered around finding the causes of accidents and removing them. It consists, first, of a review of unsafe acts and unsafe conditions. Then five topics are explored at greater length:

1. "The cause of accidents."
2. "The effects of accidents on the employee and the company."
3. "The plant's safety organization."
4. "How accidents are investigated."
5. "Don't forget" (an explanation of the way accidents reduce family security).

At the end of the course a final review session was held before the regional safety representative. He checked the training job that had been done with the group of conference leaders. Perfection was the goal in this phase, because the "graduate" conference leaders would be responsible for the training of all supervisors in giving safety talks to their foremen and employees.

When their turn came, the supervisors gave a gratifying response to the program, mainly because of its simplicity. The conference leaders had learned to conduct discussions informally and with no hesitation. Part of their delivery technique includes the use of a flannel board, an easily constructed visual aid.

This short chain of communication succeeds in getting the word about safety to the place where it will do the most good, to the worker whose productivity depends to a real degree



A STRIP OF SANDPAPER on the reverse of each display card causes it to adhere to a flannel-covered board. Materials for this type of display may be prepared at a relatively small expense.

on working safely. For it is the workers' awareness of the accident problem and their desire to do something about it that makes the plant safer for all.

Supervisory and non-supervisory personnel join in monthly safety inspection tours. They are all members of one team. Their recommendations are reviewed and acted upon by the steering committee. This latter committee's over-all report, in its turn, goes back up to the regional committee.

Participation in the GF program is spurred throughout the plants in a variety of ways. Promotion features include slogan contests, guest safety speaker appearances, safety record banners and displays, and periodic awards of free rest-period refreshments. These features get local impetus.

One Maxwell House plant manager had a series of rhyming signposts along the sidewalk leading into the plant. A typical series: "When lifting objects . . . There's a knack . . . Use your legs . . . Not your back." Plant newspapers give the program continuing publicity, and the *General Foods News*, a company-wide employee publication, gives space to results that con-

tinue to be achieved at plants throughout the country.

The precision-like detail of such a far-reaching program never overlooks the fact that health and safety go together. An accident-prone worker is often found to be suffering from a physical ailment. A well organized and staffed first-aid room looks after such things, as well as acting quickly to prevent minor injuries from becoming major cases. Some instances of accident-proneness result from a worker's having something of a personal nature on his mind, perhaps a domestic problem. Supervisors are always ready to talk things over in an attempt to uncover the source of the trouble and help the employee get it off his mind.

What it leads to

Results have been good all up and down the line. The close supervisor-employee participation in a program that is, after all, aimed squarely at personal well-being and family security promotes high morale and consequent strong team spirit. Supervisors gain in managerial ability. Many of them express their gratification at having learned something about public speaking. They feel greater con-

fidence in self-expression from the practice they get in speaking on their feet.

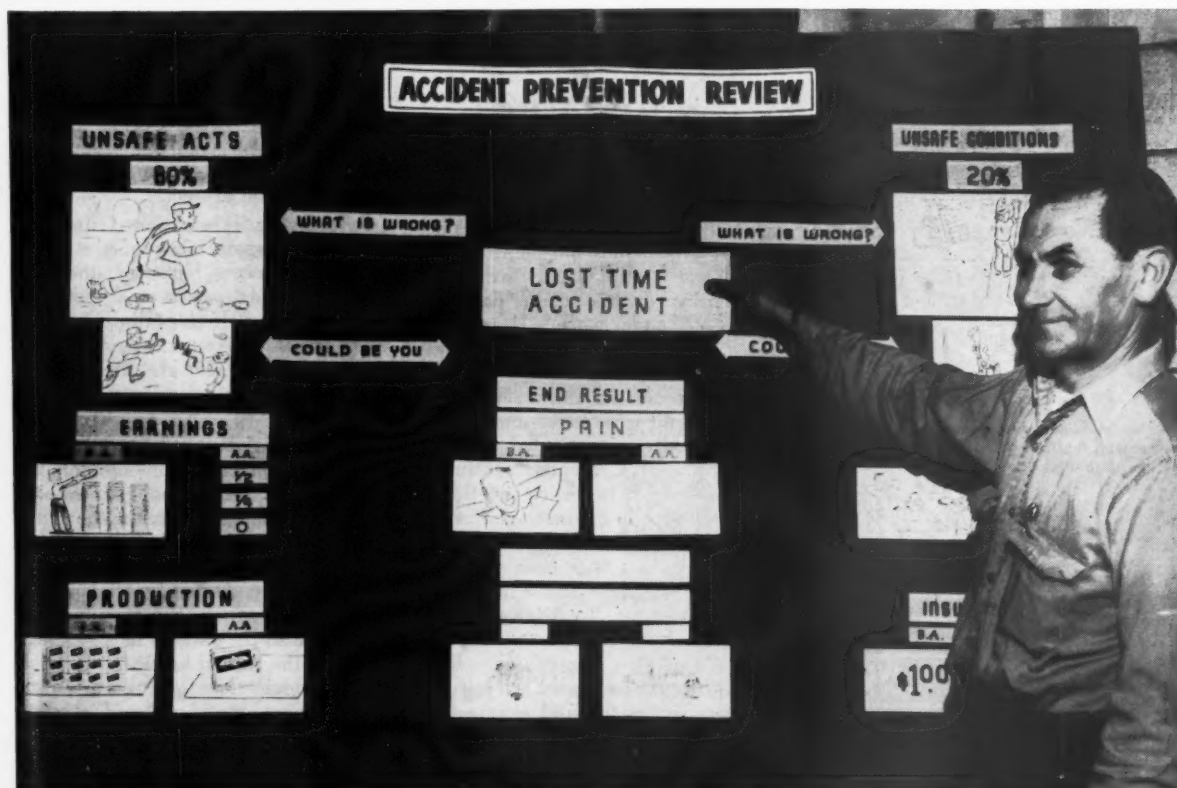
There's no danger of letdown in this safety effort. Everyone concerned feels he has gained from it in some way, both personally and in the corporate interest. Each new employee gets a brief talk on safety as part of his induction. Maintenance and housekeeping problems—the 20% slice of the safety program—are automatically reduced as safe work practices become more widespread. Production, from both quality and quantity standpoints, is generally better.

Dollar results are good, too, even if sometimes indirect. The company's most recent estimate of savings resulting from good accident prevention work is \$500,000 per year. Lower insurance costs alone account for almost \$250,000 of this figure. The remaining quarter-million dollars is realized in savings on such indirect losses as lost time, lost production, and training replacement workers.

The program, started at the top level of GF, is easily adaptable for use in any kind of plant situation. It was intended to work that way, because GF's plant operations are widely diversified.

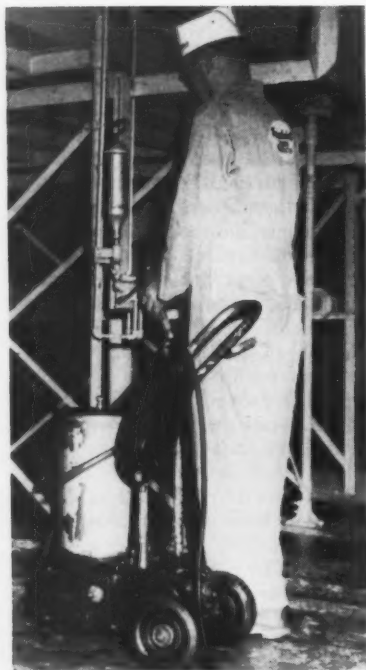
CHAIRMAN OF BIRDS EYE plant safety committee at Woodburn, Ore., demonstrates the use of a flannel board and display cards in providing

a more interesting safety course presentation designed to improve workman participation.



Lubing roundup

Summarized talks from lubrication section, Western Plant Maintenance Conference, Los Angeles, July 1954



Food

By R. C. SULLIVANT
Assistant Plant Engineer
Exchange Lemon Products Company
Corona, Calif.

TO assure the most effective lubrication in a chemical and fresh fruit processing plant which produces pectin, citric acid, lemon oil, and hot-packed and frozen lemon juice products, selection of lubricants is of the utmost importance.

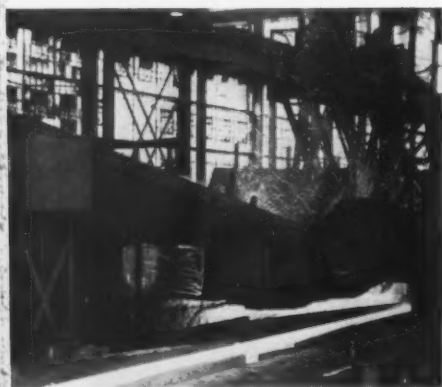
Greases for regular bearings, as well as anti-friction bearings, must have qualities of adherence to bearing surfaces to prevent moisture from entering. They must not show signs of caking or cooking rancidity after long periods of service; must resist corrosion from acids and should be easily

handled in pressure guns or centralized pressure systems.

For sub-zero temperatures, greases must remain soft and not separate. Fluid lubricants must resist corrosion and moisture, and should remain very stable and have a sufficient low pour point when applied to refrigerated equipment.

Direct lubrication duties are delegated to the supervisor of the machine and other metal shops whose supervision extends to the shift operational maintenance crews and includes lubrication men. The lubrication staff consists of three men, two scheduled for day duty and the other one on night assignment. The latter services equipment not available during day hours when operations are continuous. These three men handle the oiling and greasing of all types of bearings, from anti-friction to babbit and bronze bearings and hundreds of gear boxes, open gears, and roller chains which require frequent attention.

THIS portable electric pump lubricates over 3,000 bearings through nine admitting valves.



TOP: An automatically controlled circulating system with lub-finer filter keeps 29-in. structural steel saw lubricated.

Steel

By JAMES FRIER
Lubrication Engineer
Kaiser Steel Corp.
Fontana, Calif.

STORING of lubrication supplies is a large item in our plant. All full drums and $\frac{1}{4}$ full drums are stored in our oil yard while smaller packages are stored under cover. Drums are stored in racks, on their sides, since it is not a good idea to stand them on end because in the rainy season the drum tops fill with water and the oil becomes easily contaminated.

Setting up the calendar for lubricant application is the responsibility of the lubrication engineer and is accomplished by means of a lubrication chart. The chart lists each piece of equipment in each individual mill, and also gives a breakdown of the machine showing each part to be lubricated and at what interval, as well as the lubricant to be used. Each oiler in turn has part of the mill assigned to him and his chart shows where lubrication is required.

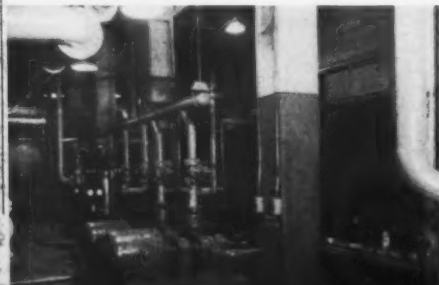
Charts are also used to provide the

department with a record of lubrication performed. A work sheet indicates how much lubricant is used and where. Copies of all requisitions are sent to the lubrication engineer's office and the recap of these shows cost of lubrication per ton of steel.

Analyzing lubrication failures is also the responsibility of the lubrication engineer. However, the turn foreman or department foreman is also consulted. If the failure in question is not a direct lubricant failure, other possibilities are investigated such as over-lubrication or under-lubrication.

The cost of wasted material in our plant is very small. In my opinion, the term wasted does not apply to the surplus lubricant showing on the outer side of a bearing where it may reside as a result of flushing. A lubricant can be too stable, having a tendency to throw away from bearing surfaces and pack in the cavities of a bearing. I prefer the type of lubricant that will flow through. Consequently, this residue cannot be considered wasted. Waste can only be referred to as that product from which no lubrication value is received.

BOTTOM: This oil cellar, consisting of two 12,000 and two 8,000 gal. tanks for two types of gear compounds, provides constant lubing.



Metalworking

By H. M. EVERSZ

Plant Engineer
McCulloch Motors Corporation
Los Angeles, Calif.

THE heart of our lubrication system is an oil house which serves as the central point for dispensing of all liquids used in the plant and salvage operations. Through the salvage of hydraulic oils, cleaning solvents, scrap metal, and other wastes, we show a dollar and cents return to the company.

Solvents had previously been dumped and used oil sold for 2c per gallon, while scrap metal had been going for the hauling. Savings in the first 9 months of the new program paid for all costs of oil house, waste bins, stills, and filters. Our preventive maintenance report for May of this year shows a total liquid reclamation saving of \$1,031.

As the system grew, we improved

the required standards of oilers and tank cleaners, and put more and more responsibility on the group's supervision. These people now feel that they have a good deal of freedom in selecting and handling the proper materials for all jobs in the plant. They have developed records and processes of analysis to a remarkable degree.

We have been able to reduce purchases of coolants, production oils, and greases by the Production Department by instituting several reclaiming procedures. All coolants are selected by the preventive supervisor working with the production and tooling department. No material can be used in the plant until it has been cleared with him. This reduces sampling and a hodge-podge of every foreman's pet cutting oil.

Coolants have a very definite bearing on machine life. Poor or improper cutting solutions can and do destroy machine ways and lubricants. All solvents and rust preventives are assigned by the preventive supervisor. Standardization of all solvents, cutting oils, and rust preventives was finally

accomplished and most parts of the plant are now satisfied.

The hydraulic specialist has grown in the department until he is now a project engineer. About twice a year he re-analyzes all liquids and their uses to make sure that the company is abreast of the times, and to see that the plant needs are truly satisfied.

After working with our fire prevention agency we developed the use of oil for safely handling magnesium grindings and chips. The reclamation of these oils has become a large factor in reducing machining costs of magnesium. We have also developed ways of filtering mag grindings out of dust collectors and reclaiming cutting oils. Hydraulic oils in die casters and grinders are reclaimed or filtered on the machines. This job alone has improved machine life and reduced down time to a large extent. We previously had six men in our die cast department doing nothing but machine repair. Now we have two.

All our trichlore materials are redistilled and dispensed to the degreasers spread about the plant.

Aviation

By ARTHUR E. ZOBEL

Plant Engineering Supervisor
North American Aviation, Inc.
Los Angeles, Calif.

SELECTION of the proper lubricants for each machine should be made by careful analysis of service requirements, experience within your own organization on similar applications, equipment manufacturers' recommendations, and advice of the lubrication engineers available from your sources of supply. Effective control can best be had by standardizing on a minimum number of types and grades.

All lubricant application equipment should be selected with the utmost care. Centralized lubrication and special automatic application should be considered where feasible and hand application used only where other means are not desirable. The proper application equipment is just as important as the lubricant; if it does not reach the parts it protects in the manner required, failure or damage will result.

Lubrication failures should be carefully analyzed to determine the causes so that remedial action can take place. At any given point, a different lubricant may be indicated, application

techniques or frequencies changed, or sources of contamination eliminated. This may require a laboratory analysis to identify the contaminant, a search for the source, or additional training of personnel.

At North American a lubrication record card is on file for each machine in service. When a new machine is received, installed, and inspected, a record card is filled out listing the points of lubrication, the type of lubricant to be used, and the schedule for servicing. The card is filed with the Work Control Section of the Maintenance Department, whose clerk checks the cards scheduled for servicing each day and issues a lubrication notice to the responsible serviceman. A copy of the record is attached to each machine to aid the serviceman if decals are

obliterated, and also to make sure that the machine is completely serviced.

We find it best to store all lubricants in their original containers coded for identification so they may be dispensed directly to the application equipment.

When machine trouble indicates lubrication is faulty, the maintenance foreman and lubrication specialist determine if the machine was properly serviced. If contamination exists, these two locate the source of contamination, and if need of a different lubricant is indicated, a staff member may be called in to assist and advise. Laboratory representatives will assist in identifying a contaminant and will handle other testing required. When the seriousness of a problem warrants, we consult a lubrication engineer from the supplier.

LUBE points on this turret lathe are indicated by decal numbers in different colors to designate type of lubricant required.



— Standby power —

What it can mean to you



By
J. M. ETS-HOKIN
Assistant to the
President
Ets-Hokin &
Galvan Co.
San Francisco
Calif.

THE governing principle of emergency electrical standby power for industry is this: the more dependent a given institution upon continuous electrical power required for proper functioning, the more need it has for positive assurance that electricity will continue. The only positive assurance is another source of electricity. As reliability has gone up and kilowatt hour rate down, industry in the West has become far more dependent upon electrical power than would have been thought possible 15 years ago.

Illumination, automatic production machinery, automatic safety devices, electronic counters, business machines, paging systems, fire alarm systems, time clocks, typewriters, refrigerators,

electric ovens, motor driven chassis lines, heating and ventilating systems are but a few of the areas in which continuous electrical power is a necessity.

With the increasing availability of this power, dependence upon it has grown to the point where not only competitive efficiency but often operation without huge loss is dependent upon an unwavering supply of electrons. Most of us take the reliability of utility power for granted, but still we show less confidence in our ability as automobile drivers, or the fact that our house won't burn down in the next year, than we do in the vulnerability of our local utility company. Most of us have automobile insurance and fire insurance, but I don't think nearly so many have power-failure insurance.

In many cases industry is taking an outside chance in relying entirely upon public power. I have run across literally hundreds of situations where the loss from one hour of power failure could have paid for fifteen or more standby power installations.

Bakeries

Large bakeries use ovens which are essentially pre-heated, the actual heat-

ing elements being off during the baking of the bread. After a period of time the oven doors open automatically and the attendants remove the loaves. If there is no electricity to operate the automatic doors at the precise moment when the bread is ready, a great deal of work will have gone up in smoke.

Electronics

In the manufacture of certain electronic tubes, gas must be evacuated to just a certain pressure and the tube sealed. To assure proper ionization of the gas, tubes must be fed current for a certain period of time during and immediately after sealing. If this current is unavailable tubes will be ruined.

Many servo mechanisms have lock-out features so that if power fails the whole control unit locks and cannot be started again for usually 10 to 15 minutes after the power is out. To start it up again requires the service of a skilled technician and usually expensive repair.

Despite the current reliability of present power sources in the West, storms, earthquakes, fires, and other natural phenomena, mechanical causes such as an airplane crash, a hunter shattering a connector in a rural high-line, a freak explosion, etc., are things beyond the control of the most efficient utility company.

A definition

Standby electric power is any device other than the normal source of electricity which assures the continued generation of electricity in the event of failure of the normal source. Such assurance is accomplished by this device producing and/or conducting electrical power when necessary.

There are essentially three types of standby devices:

1. A second line from another substation of the commercial utility company. This type of standby is the least costly, but, as the utility company will be the first to admit, is really not positive. If power failure is limited to a substation it works, but if the power failure is general, it is useless.



THE Jake Van Dyke Dairy of Anaheim, Calif., maintains 25,000 watts of standby power to keep electric milkers running.

HELMS BAKERIES of Los Angeles has a 35,000-watt engine-generator system on guard at all times.

2. A bank of storage batteries maintained by a trickle charge from the line. These are automatically and immediately kicked over in the event of power failure and go to work immediately. There are, however, several drawbacks. First, the length of time for which batteries will work is limited to about an hour and a half. Thus, in sustained failures, batteries are useless. Secondly, batteries produce direct current only and without the aid of a converter, which is usually quite expensive and cuts the battery life in half, are limited to incandescent illumination. Industrial machinery and practically all power appliances work on alternating current and consequently will not perform on batteries.

3. The engine-generator. The engine-generator consists of an internal combustion engine driving an electric generator which, in turn, produces a variety of electricity identical to the primary source of power in frequency, phase, and voltage. The engine-generator is the most practical variety possible for general industrial use for the following reasons:

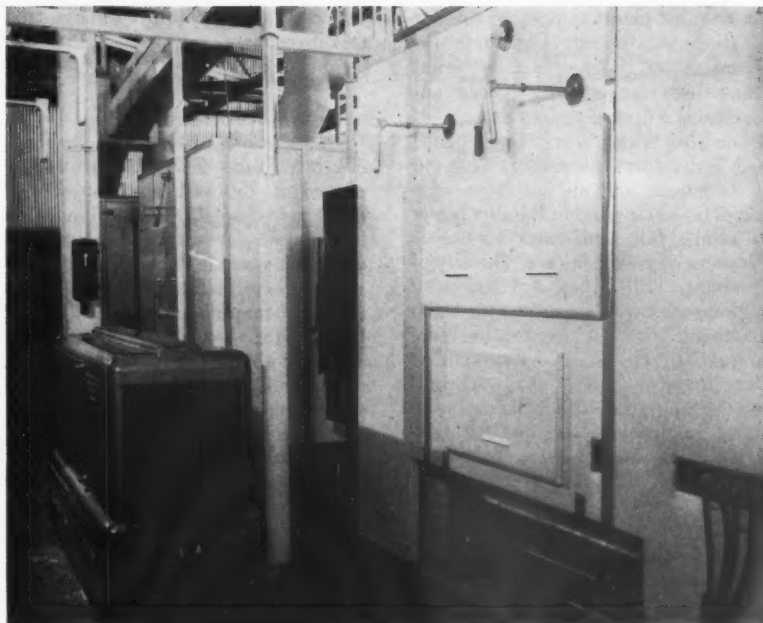
a. The engine-generator can produce the exact type of electrical power normally employed in a factory. If Factory A uses three phase, sixty cycle, 120/208 volts, it can purchase equipment which generates electricity of this exact specification.

b. The engine-generator is ideal for sustained power failures since the only limiting factor upon its continuity is fuel, which can be easily stored in terms of a week's needs without creating a space problem.

c. The engine-generator unit forms a compact power plant per kilowatt output. It is readily and inexpensively installed and can be moved about after installation if need be. Some engine-generator manufacturers make fully-housed units for outdoor use and one manufacturer goes so far as to make a complete line of trailers and dollies which will fit any of his basic-size power units.

d. The power user can have hand-start, electric start, automatic starting upon actuation of any light or appliance switch, or automatic standby starting equipment, depending upon the needs or preferences of his particular operation.

e. This type of equipment is identical in principle to methods of electricity production practiced by most utility companies. It is the most positive insurance against failure.



Leading power companies have been among the first to recognize that if electricity were not so abundant, inexpensive, and generally reliable, industry would not have put itself in the state of dependence upon it that it has. Consequently, power companies often attempt to persuade certain of their accounts to get standby power and also use it themselves.

Protects microwaves

Pacific Gas and Electric Co. has standardized on a type of small engine-generator made by D. W. Onan and Sons Co. for protection of its microwave installations. The units, 3,500 watt plants, are air-cooled and highly reliable. PG&E has had occasion to depend on every one of these plants at least once. Considering the protection afforded, the investment is obviously worthwhile.

On the other hand, PG&E uses a number of engine-generators solely for standby of their own equipment. These go all the way up to 100,000 watts. At

the Antioch steam plant, the company has a bank of large steam turbines solely for the protection of the steam plant itself in the event of damage to the main generators.

Southern California Edison in Los Angeles has a 5,000-watt engine-generator. Coast Counties Gas and Electric Co. in Concord maintains several 1,000-watt engine-generators for its Motorola Communications equipment. Gridley Municipal Utilities in Gridley, Calif., has two 35,000-watt engine-generators to protect its sewage disposal plant and the Citizens' Utility Co. in Redding, Calif., has a 3,500-watt power plant for microwave standby.

The State of California purchased over \$200,000 worth of standby engine-generators rated between 5,000 and 25,000 watts to protect key installations in accordance with Civil Defense during 1952 alone. The Radio Equipment Vault at Mount Diablo State Park is protected by a 10,000-watt engine-generator and two State Capitol buildings have automatic

RADIO station KGON at Oregon City, Ore., stays on the air with the help of 10,000 watts of standby power.



25,000-watt plants to operate communications equipment. The State Department of Highways has found many uses for standby power and maintains a fleet of generators.

San Jose Water Works has a 3,500-watt generator to protect at least one of its pumps and all telephone companies maintain enough standby power to handle full continuous service in the event of power failure. The city of Pittsburg, Calif., has a 10,000-watt engine-generator protecting its water treatment plant, thus avoiding contamination. The Merced County Fire Department has a 15,000-watt unit and the Sunnyvale Public Safety building in Sunnyvale, Calif., has a 10,000-watt engine-generator.

How much protection?

An emergency standby serves a specific purpose in industrial use—positive insurance against power failure. The question arises: To what extent should a given plant be protected? I think we can apply a very simple governing principle to help us answer this question. Those operations and/or devices which depend upon continuous electrical power to avoid irreparable economic loss equal to or greater than one-half the cost of installing a standby power plant, this loss being incurred by only one failure, should have standby power.

For example, suppose that the Farnsworth Baking Co. will lose \$1,500 if their electric oven failed to automatically open in the event of power failure. The automatic door opening feature requires 500 watts of power. An engine-generator of this size, installed and designed to operate automatically in the event of power failure, costs around \$400 complete. In this case standby equipment would be a good investment. At the same time it would be a mistake to endeavor to protect the entire oven. The worst loss that could be realized would be about \$400 worth of labor, but to protect the ovens would require a 50,000-watt engine-generator worth from \$8,500 on up. Twenty or more power

failures would be required to amortize this investment.

Wise applications

Varian Associates of San Carlos, Calif., manufacturers of a precision electronic tube called thyatron, purchased a 750-watt engine-generator for approximately \$300. Thyatron tubes, used for final transmitters in television stations, have filaments that must be kept under current in the last stages of manufacture. The tube will be ruined if allowed to cool off. In this instance, a relatively small investment protects thousands of dollars worth of equipment at one time.

Consolidated Vultee Aircraft Corp., of San Diego, Calif., owns two 35,000-watt engine-generators which perform a double task. Mounted on heavy duty trailers, they are used both for continuous field operations and as a part of the regular factory electrical load in the event of breakdown.

Radio stations KSFD and KCBQ of San Diego have 35,000- and 25,000-watt engine-generators respectively. Each station has had to use its standby equipment on occasion in this, a business where time means money.

The Glen Zeller Hatchery of Escondido, Calif., maintains a 10,000-watt engine-generator to protect its incubators. The unit cost about \$1,500 complete and was used five times in the past year for savings of approximately \$5,000. An engine-generator is easier to service than an automobile. It runs at relatively low speed, is stationary, quick to start, and runs at constant speed. Small gasoline and gas engines start up within a matter of 5 to 10 seconds and immediately assume their electrical load without stopping until they are turned off.

Certain units have been known to run as many as 15,000 continuous hours without needing any repair. This would be comparable to driving a car at 30 mph. for 450,000 mi. without engine work of any kind.

The two basic types of engine-generators in widest use today are (1) diesel and (2) ignition (gasoline, bu-

tane, propane, natural gas, etc.). Each type has its applications and corresponding advantages.

Diesel driven engine-generators are more limited for standby use than the ignition variety since they are usually not adjustable to instantaneous automatic starting. If non-automatic starting is permissible, however, the diesel unit is generally a good buy since fuel is quite cheap and maintenance costs relatively low.

Most standby installations in industry require instantaneous and automatic starting and for this reason ignition type engine-generators should be employed. The basic components of a standard standby system follow:

1. The engine-generator equipped with reliable automatic cranking device of the solenoid type which will crank the engine continuously until it catches hold. The solenoid should then instantaneously provide for disconnecting the starter. Cam operated or so-called "recycling devices" should be avoided since their record of reliability is extremely poor.

2. A line transfer switch, connected to the power line and the generator plant. It closes the contacts to the automatic engine cranking device when the power fails and then transfers the electric load from the power line side to the standby side. Automatic line transfer switches should be both mechanically and electrically interlocked. Any unit which employs a cheaper type of construction should not be considered.

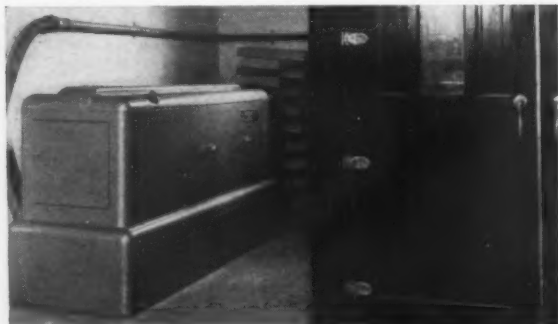
Certain modifications are available on the line transfer for actuation due to low voltage drop and for special purpose installations. In general, one should purchase this piece of equipment through the same manufacturer who makes the engine-generator.

3. Starting batteries are of automotive type usually rated at 6 to 12 volts. Any reliable automotive battery such as Hobbs, Willard, Exide, will do. Batteries should be hooked up to the line through a trickle charger and automatically regulated so that they are always charged.

Manufacturers

D. W. Onan and Sons of Minneapolis, Minn., are the world's largest manufacturers of engine-generator equipment. They manufacture diesel units from 3,000 to 55,000 watts and gasoline units (including natural gas, propane, and butane) from 400 to 50,000 watts in both air-cooled and water-cooled units.

Kohler of Kohler, Wisc., also makes a line of gasoline driven engine-generators from 400 through 15,000 watts.



HEIN'S Turkey Hatchery, Portland, Ore., keeps 25,000 watts of standby power to protect its incubators from overheating.

Industrial management methods for small plants surveyed

First in a series of articles

By
EARL E. R. JONES
Engineering Extension
University of California
Berkeley



and
LOUIS E. DAVIS
Industrial Engineering
University of California
Berkeley



How big and small companies differ

Size, not activities

Survey reveals that the former determines the management techniques, not the tasks in which the company is engaged.

Key is who does what

Each member of large-company management can, and usually does, confine his interests and efforts to a relatively specialized area; consequently, he develops special management skills to a fine degree. He may call for staff assistance when problems of a new or unusual nature arise. His plans are laid for long periods in advance of operations.

The managers of small companies, on the other hand, cannot rely upon staff help, for they have no staff. They cannot specialize; on the contrary, they must possess a wide variety of skills which understandably become only partially developed. They must demonstrate the ability to bring each skill to bear at the proper time and in the proper perspective. Their plans are made for relatively short periods of time.

Small plant flexibility

Thus it can be seen that the coordination of many management specialists, a major problem for the large firms, is of minor importance to the small

ones. The short-range planning of the small firm, though it may appear less efficient, permits a degree of flexibility in operations which is the bread and butter of the small company and sometimes the envy of the large.

Small plant handicap

The small firm suffers from certain deficiencies related to the extensive scope of the manager's responsibilities. In executing his many duties as both line supervisor and staff specialist, he frequently fails clearly to identify each of his numerous functions and, as a consequence, fails to develop the necessary proficiency in each of them.

Lacking proper delegation of responsibility and authority, the management then becomes a "one man show." At this point the problem is twofold. The manager becomes overburdened, and no provision is made for adequately developing managerial talent to share the burden and to assure continued operation of the business.

What's the answer?

What is to be done about it can be seen partially in an examination of the management practices of small plants as reported here, and in recommendations to be brought out in the remainder of this report which will follow in subsequent issues.

THIS university has set out to answer a long-voiced objection by managers of small manufacturing firms and small businesses that industrial management as taught in universities and reported in the standard texts does not fit their conditions.

Such studies, these managers feel, are concerned chiefly with the problems and complexities of large scale operation and therefore are of little help to the small organization.

Consequently, we have conducted a survey to determine: first, what the actual management methods are in small manufacturing companies in the San Francisco Bay area; second, the nature of the differences between the management of the large and the small company. This is the first of a series of articles reporting the results of the survey.

First with new methods

It is not surprising that large organizations are the first to develop new methods. When large numbers of people are engaged in high production, minor improvements can result in major benefits. Personnel is available to develop new methods. Management scholars become interested and their reports are widely publicized. All of this is reflected in course materials in the universities.

Nor is the paucity of data concerning the small company surprising. Small organizations have not been overly free in releasing information concerning themselves, nor have they formed associations for the purpose of studying and developing solutions for their common problems.

The small business manager has been encouraged to remain conservative in regard to adopting formal sys-

tems because of his intimate knowledge of the business, plus his flexibility and skills. But it has become apparent to him that flexibility and skills alone are not sufficient to develop and maintain his ability to compete. As a result, many local small-plant managements have called on Industrial Engineering and Engineering Extension of the University of California in recent years in regard to a number of problems, with management methods prominent.

Our desire in the survey was to learn: (1) whether small organizations actually employ different managerial methods, organization, and techniques; (2) whether they modify recognized methods and techniques to satisfy their own special requirements; (3) the nature of these special requirements.

The short-range objective was to uncover and make available to others information as to the present state of management knowledge, skills, and methods, and to evaluate the methods. The long-range objective was to determine the similarities and differences between the needs and practices of small and large manufacturing firms, so as to provide a basis for adapting present techniques and proposing new

ones where necessary. Ultimately it is hoped to develop a course or group of courses which will be of direct benefit in training for the management of small firms.

Methodology

With these objectives in mind, the University of California, through its Industrial Engineering and Engineering Extension groups, assisted by the Oakland Chamber of Commerce, launched this fact-finding survey. Instrumental in the conception and planning were Prof. E. Paul De Garmo of the university and Kenneth Moeller of the Oakland Chamber of Commerce.

The survey method consisted of interviewing small plant managements regarding their methods of handling recognized planning, operating, and controlling techniques. A stratified sample was selected from small manufacturing plants in the San Francisco-East Bay area, which was representative of the size, function, and type of industry to be found there.

The Oakland Chamber of Commerce secured the cooperation of 30 companies that were selected as the sample. Of these, 27 participated in the study. The companies ranged in size as follows:

Group	No. of employees	No. of firms in sample
A	8-24	12
B	25-49	10
C	50-99	5

The average number of employees per company in the sample was 33. Companies interviewed included those designated as job shop, functional shop (that is, specialty shop providing a service limited in scope but expensive to duplicate for low-volume production), manufacturers of custom products, as well as those engaged in volume production of solid or liquid items.

Product-wise, the firms selected represented a cross-section of local industry. Included were manufacturers of food and candy, metallic and non-metallic building materials, machine and electronic components, boxes and cosmetics, job shops, and functional firms specializing in such services as galvanizing and heat treating.

The interview

Each firm in the sample was visited by an interviewer who spent from three to four hours with a member of top management. Whenever possible, the production facilities were inspected. In accordance with a previously prepared outline of topics, the interviewer asked questions calculated

Previous surveys

Three studies of management practices in the West have been published in **WESTERN INDUSTRY**.

One survey, which covered 211 plants throughout the West, was conducted by **WESTERN INDUSTRY** in co-operation with universities and management consultants. The results, published in 1950, endeavored to show the comparative progress in methods between the East and the West.

Comparative practices in industrial engineering methods between Southern California and the Midwest and East were reported in February 1952, the study having been made by Dr. Ralph L. Barnes at UCLA.

Another, conducted by Oregon State College, surveyed job evaluation, time study, wage incentive plans, and merit rating, in the Portland area. A summary of it appeared in the December 1953 issue of **WESTERN INDUSTRY**.

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Titanium ingot, 25" in diameter, 51" long, weighing 4,050 lbs., melted at 3140°F., and the water-cooled copper mold, which would melt at 1980°F. if it were not for copper's high heat conductivity. The flange on the mold is steel, welded to the copper by the inert gas shielded arc method, using silicon copper rod.

to reveal the firm's techniques and its effectiveness in applying the tools of modern management.

The planning function was investigated by reviewing sales forecasting, production planning and scheduling, and the planning of materials, labor, processes, and product. Operational methods discussed included budget, standard costs, selection and design of equipment, facilities and production methods, wage payment plan, and accounting.

Methods of control examined included the control of production rate, labor, quality, costs, materials, and tools. At the conclusion of the interview the management of each firm was asked to indicate what it considered to be the major problems confronting it in the conduct of the business.

Findings

Before proceeding with the detailed findings, it is important to indicate some of the limitations regarding the survey and the data.

1. The findings reported are taken from information gathered in interviews. It is assumed that the data provided are accurate as reported.

2. In the planning stages of the survey it was indicated that securing the cooperation of small plant managers would be contingent upon accepting certain limitations in the information to be gathered. These concerned matters of finance, worth, and cost comparisons between companies.

The result of this limitation is such that the survey can report only on the management methods in use and a comparison of them to the methods of large organizations.

It is impossible to indicate in relation to the management methods discussed what effect their use or lack of use has had or will have on a company's competitive position, its financial status and growth, and its profit margin.

3. In the findings and such evaluations of them as are possible, criticisms will appear from time to time. These are intended to be constructive. There is no intent, implied or otherwise, to compare the small company with the large.

The small organization has some excellent features. Large companies in fact spend considerable time and money attempting to duplicate these so as to secure some of the advantages found in the small organization. In general their attempts are not too successful.

It is premature and would be presumptuous of the authors to say after so brief a survey and so early in the study of the small company just what

its organization structure should be like, how it should behave in terms of practices, procedures, and communication, and what steps it might take to overcome its pressing problems. Certain weaknesses are outstanding and these will be indicated. The remainder will have to wait for the collection of additional data.

Ownership

The ownership of the companies in group A was about equally divided among three classifications: single ownership, partnership, and corporation. Group B had a similar distribution but with a slightly larger number of corporations. Group C on the other hand included no single ownerships and was about equally divided between the others. In most cases the owners were participating actively in the management of their companies. The average age of the firms studied was just over 20 years; the youngest company had been in business for five years and the oldest for 66. About half of the firms had been in business during the depression of the 1930's.

Organization

All of the companies studied had a simple line type of organization. None of the organization structures contained staff departments or had staff personnel in the role of the assistant to the president or to the general manager. The executive officer, or general manager, was either the sole owner or a major investor.

About a third of the firms reported the use of an executive committee which actually made management decisions in some cases, while in others it acted as a sounding board for the ideas from one or more sources. In every case the chief executive of the firm was a member of this committee.

In most cases it was difficult, if not impossible, to distinguish between individuals responsible for policy making, on the one hand, and for operation on the other. No effort was made to separate the two levels. Both of the activities were taken together and classified as "policy and management."

The number of persons employed in these activities in the various groups was reported as follows: group A ranged from one to five, with the predominant number being one or two; group B showed a range of from one to 13, with the concentration again at one or two; group C ranged from three to five, with the average at three.

All of the companies reported the existence of two departments—office and production. As a rule, however, most of the firms had only one for-

mally organized department: production. Typically it was the largest in the company and the only one organized so as to provide definite levels of authority and responsibility, and having channels of communication.

The concentration of interest on production is typical of the small or owner-directed business. The major skills possessed by management are related to production and the growth of the business is a result of the ability to produce a product or service.

Half of the general managers in groups A and B assumed direct responsibility for managing the production function. In group C this dropped to 40%. It might be mentioned, however, that in many cases the general manager took an active interest in overseeing the production function, even though it was the responsibility of a member of the second level.

On the average, the number of foremen employed in the various production facilities is as follows: group A—1; group B—2; and group C—3 to 5. In the latter case some of the individuals referred to as foremen might more properly be designated as supervisors who direct the activities of one or more sub-foremen or lead-men.

As indicated before, the office department was not carefully planned as to functions to be performed nor well organized. Under the heading of office were grouped a collection of residual functions which were actually performed or at least headquartered in the company's business office. Exceptions to this general rule will be noted.

The office characteristically included one or two top managers, one of whom sometimes handled most of the sales in addition to his other duties. One half of the firms in groups A and B had designated office managers. The remainder relied on the chief executive to perform this function. All firms in group C had office managers.

Thirty per cent of the firms reported having sales organizations of departmental rank. For all sizes of companies, this function is the responsibility of the general manager in 80% of the cases. This is so because in many companies the general manager discharges all functions, although he is somewhat inclined to delegate responsibility for production to an assistant.

As might be expected, the concept of the staff man was not generally found, most of the functions being performed by line personnel. One firm in group B reported that it employed one man to carry out research; and one firm in group C indicated that it included on its staff two product design engineers, a sales engineer, and an advertising manager.

FREEZING

In a paper presented at a meeting of the American Society of Refrigerating Engineers in Seattle recently, Thomas G. Thompson, Professor of Oceanography at the University of Washington, indicated that there exist definite possibilities of obtaining fresh water from sea water by refrigeration.

For sea waters of average salinity the temperatures of maximum density are below the freezing points. As sea water freezes, fresh water precipitates as crystals of ice. Brine remaining from sea water frozen in the laboratory collects mainly on the bottom of the vessel while the ice formed is of rather porous nature due to the entrapment of brine.

Fresh water obtained by the melting of ice formed by freezing sea water in the laboratory will not be entirely free of salts, as would be the case if water had been procured by distillation.

MEMBRANES

Another process being investigated by which salty or brackish water can be demineralized is by putting it through an ionics membrane demineralizer.

The process uses the property of certain plastic membranes to pass only electrically positive particles and other membranes to pass only electrically negative particles. When salts are dissolved in water, they break up into equal quantities of positive and negative particles, which move in opposite directions in an electrical field. Use of an electrical membrane to process for fresh water may turn out to be feasible for brackish water, but it is highly unlikely that its use would be considered for conversion of sea water. An \$88,000 contract for field tests to be carried on about 20 miles West of Phoenix, Ariz., has been awarded to Ionics, Inc., Cambridge, Mass., by the Dept. of Interior.

From salt to steam

PG&E to convert sea water for the boilers

at its Morro Bay steam-electric plant

SEA WATER will be converted to fresh water for industrial use for the first time in this part of the world when Pacific Gas & Electric Co. installs two sets of "triple effect evaporators" at its Morro Bay, California, steam-electric generating plant presently under construction.

The fresh water system, designed by PG&E and Bechtel Corp. engineers, in co-operation with The Lummus Co., New York, is necessary to assure complete dependability and at the same time conserve the local fresh water supply. There will be a set of sea water evaporators for each of the plant's two boilers, each having a capacity of 50 gal. of fresh water a minute, or 72,000 gal. a day. Fresh water production can be controlled and only enough will be made to satisfy plant needs. To produce 50 gal. of fresh water, about 150 gal. of sea water must be processed.

A comparative analysis of the relative freshness of fresh water shows San Francisco city water to be 250 ppm., product of the triple effect evaporators 50 ppm., and the water finally used in the boilers $\frac{1}{2}$ ppm.

This process of converting sea water to fresh water has been common aboard ship for sometime. The problem was given intense and exhaustive

study during World War II and the system has also been used by oil companies in Arabia.

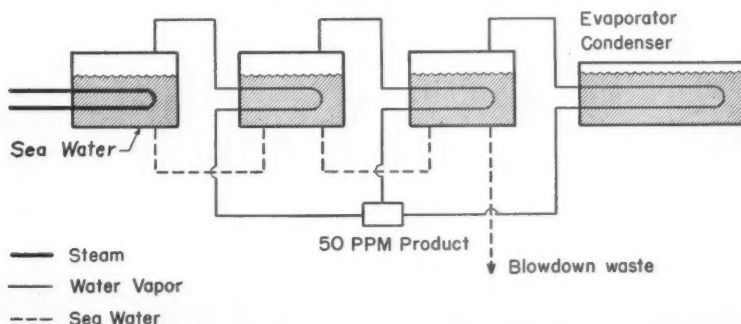
The two sets of evaporators, while operating independently, will be connected so that one may replace the other, adding further dependability to the fresh water supply. This absolute dependability of the fresh water supply serves as insurance to protect a \$44,000,000 investment.

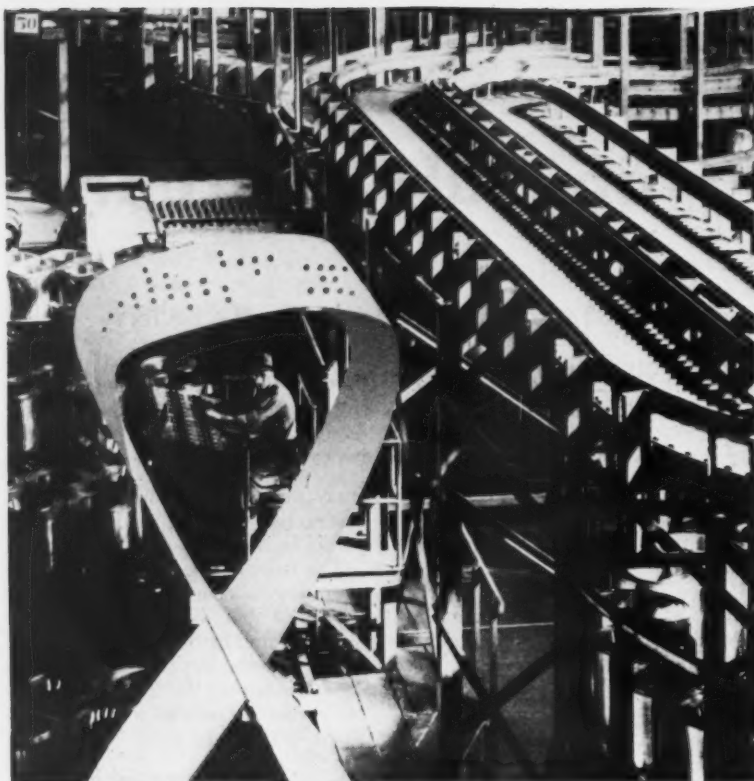
How it works

Each "triple effect set" evaporator will consist of three cylindrical tanks mounted horizontally. Each tank is 17 ft. long, 6 ft. in diameter, and contains 290 one-inch tubes set $\frac{7}{8}$ -in. apart in its lower half. Heat for the first tank will be supplied by steam from the station evaporator, part of the plant's steam system. This steam at 225 deg. F. and a pressure of less than 5 lb. per sq. in. will heat the one-inch tubing over which raw sea water will be passed. The steam created as sea water in the first tank will be used to heat the tubes in the second tank, then will pass to the station's evaporator condenser. Steam generated in the second tank will heat the third tank and also go to the station's evaporator condenser.

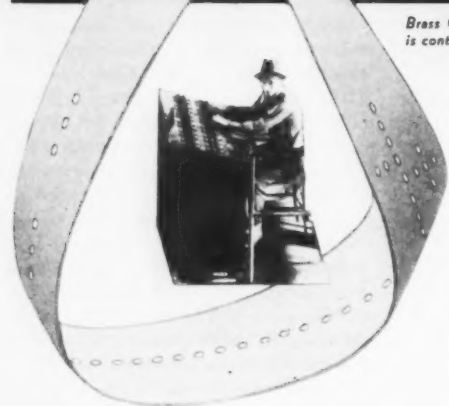
Brine formed in the boiling process

Triple effect evaporator





Brass Coil Storage Conveyers. Flow of materials is controlled by the one operator at pulpit.



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54

will be drawn off continuously at the bottom of the tank, and the fresh water will be purified further before being injected into the main boiler feed water system.

The first effect will distill about 13 gal. per minute at 190 deg. F. Effect 2 will produce about 16 gal. per minute at 162 deg. F., and Effect 3 will produce about 21 gal. at 123 deg. F.

The raw sea water will be introduced into the first evaporator at about 115 deg. after having been used in the station auxiliary cooling system and evaporator condenser. Salinity in the evaporators will be maintained at about 150 percent of normal, a meter with an audible warning device being used to check the contents expelled from the third tank of each unit, to guard against the formation of salt crusts around the steam tubes and tank interiors. Increased but controlled salinity, combined with low boiling temperatures in the introduction of starch and boiler compound, is expected to minimize the salt crusting.

Further application of converting sea water to fresh will only be feasible where (1) fresh water is needed but not commercially available, and (2) fuel costs to run the conversion process are not prohibitive.

NEW ATOM SMASHER unveiled in Berkeley

THE WORLD'S most powerful atom-smasher, the massive Bevatron, built with Atomic Energy Commission funds at the University of California Radiation Laboratory, Berkeley, has fired its first nuclear missiles.

The machine has already accelerated protons, the nuclei of hydrogen atoms, to 4.7 billion electron volts, the highest energy ever achieved by an atom-smasher. Berkeley scientists are now working to push the instrument to its design energy of 6.25 BEV.

NEW STRETCH PRESS is nation's largest

NORTHROP Aircraft, Inc., is installing the nation's largest sheet metal stretch press at its Hawthorne, Calif., main plant.

The new press will be capable of forming substantially larger sections of fighter plane fuselage and wing skins in a single operation and will accommodate aluminum sheets measuring as large as 14x20 ft. Rated stretching force is 750 tons.

For more details circle No. 39 on Reader Service Postcard

WESTERN INDUSTRY — September, 1954



EXPOSED TO DIRT, GREASE, AND MOISTURE, A G-E PACIFIC GEAR-MOTOR DRIVES A CONVEYOR BELT IN A CALIFORNIA GOLD MINE.

New **TRI 55 CLAD** motors make G-E Pacific Gear-motors an even better low-speed drive

Now equipped with the new Tri/Clad "55"—a motor designed and built to last longer—General Electric Pacific Gear-motors are your best choice for a dependable low-speed drive.

EXTRA-PROTECTIVE FEATURES

The Tri/Clad "55" motor is built with extra-protective features to withstand the rugged conditions of dirt, grease, and moisture found in the toughest applications such as mining. New, tougher insulating materials and the superior bearing system of this motor reduce maintenance and give you even better performance for a longer period of time. Here's why: **SILICONE DRI-FILM*** insulation which coats the entire stator assembly repels water and virtually eliminates insulation failure due to moisture. New non-hygroscopic insulation material in the stator itself resists moisture.

POLYESTER FILM SLOT insulation is 8 times stronger than electrical insulation used in ordinary motors.

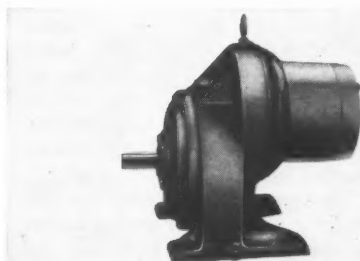
FORMEX* WIRE stator windings won't break down, will resist solvents, moisture and heat. Wire is bonded by Glyptal* varnish to help protect against full-voltage starting stress.

ADVANCED BEARING SYSTEM of the Tri/Clad "55" motor did not show even a 10% failure during 10,000 hours of accelerated life tests. Use of a greatly improved synthesized grease with 8 times greater mechanical stability than ordinary greases is one reason for Tri/Clad "55" motor bearing superiority. Larger, heavy-duty ball bearings give even longer service, and sealed bearing housings help prevent leakage of lubricant and entrance of dirt.

CHOOSE FROM A COMPLETE LINE

A new motor, with more horsepower per pound and higher full-load speeds in a smaller frame size, combined with the same reliable, high-quality gear make the G-E Pacific Gear-motor an even more compact, more efficient low-speed drive. For the best low-speed drive for your operation—no matter what enclosure, mounting, or shaft speed you require—specify General Electric Pacific Gear-motors.

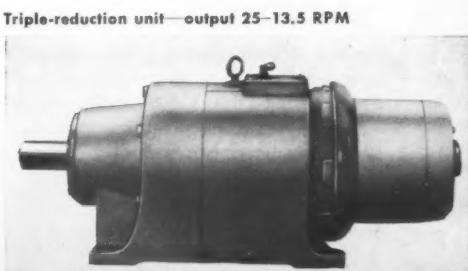
For more information contact your nearest Apparatus Sales Office or write for Bulletin GEA-6076 to General Electric Company, Section 648-21, Schenectady 5, N. Y.



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Higher production through pre-drying

Inexpensively constructed pre-dry sheds double dry-kiln output, improve quality

By DONALD E. HARPEL
Dry Kiln Superintendent
Leonard Lundgren Lumber Co.
Bend, Ore.

A SYSTEM of "pre-dry" sheds for processing lumber between the green chain and the kiln drying sheds has increased the production of kiln-dried lumber by 700,000 fbm. (board feet) in one month at the Leonard Lundgren Lumber Co., Bend, Ore.

Ponderosa pine marketing conditions in the West make the volume of kiln-dried lumber available on short notice an important factor in satisfying market requirements. Therefore any means of increasing dried lumber production puts a mill in a better competitive position, requires less air drying space and less dependence on conditions of weather and temperature, and allows a smaller inventory of milled lumber.

Our company considered the customary procedures for drying lumber between green chain and kilns but found these uneconomical for the volume to be handled. We considered package piling directly off the green chain (a conveyor on which freshly cut lumber leaves the mill) to obtain maximum air drying. Transportation and handling costs, however, overshadowed any gain under this system.

Construction of pre-dry sheds, attached directly to the "green" (incoming) end of the kilns appeared to be the answer to pre-drying lumber at a moderate expense while speeding lumber through the dry kilns with the same quality of production.

The frame pre-dry sheds are 40 ft. long, constructed of 2 x 4's, 4 x 8's, and 6 x 6's of Douglas fir, with roof trusses of laminated 2 x 8's with the span equivalent to the width of the double track kilns. Centermatch white fir was used for the sheathing, and the roof consists of No. 5 common Ponderosa pine covered with 90-lb. roof-

ing paper.

We also built our own doors of 6-in. white fir centermatch and hung them on a double roller system. Construction of these buildings was simple and was done with a minimum of expense in materials. We built the entire shed, which has a larger area than our three kilns, for the cost of one kiln building. The building sheathed with centermatch and painted inside and out has made a fairly tight structure.

Pattern

A 6 x 6 ft. opening behind each fan on both sides of the building represents the circulation pattern of the shed—straight through with no recirculation. This type of pattern requires a great deal of steam. It would only be a small problem to baffle and recirculate the air through the sheds, and in time we may be forced to do this. We have also built cupolas on each shed roof peak and have allowed an 18-in. opening in the roof between the kiln and the sheds to handle the escape of steam from the kiln doors.

The size of each individual charge is 33,000 to 39,000 fbm. of lumber and consists of four cribs. The variation is due to width and length. For example, a charge of No. 3 clear mostly 12 in. wide and 16 ft. long would be nearly 39,000 fbm., but a charge of moulding with a large amount of

LUMBER stacked in pre-dry sheds attached to the receiving end of dry kilns is dried by a pair of fans in each crib.

shorts and narrow width would be around 33,000 fbm.

Our lumber is bar piled into unit cribs 13 ft. 6 in. high and 9 ft. wide by contract crews. The lumber is even-ended against a back board, and a side wall is used to maintain a uniform side. Stickers are 2 in. wide by $\frac{3}{4}$ in. thick by 9 ft. 6 in. long. Five 3-in. aluminum channels are used for sticker guides.

The loss in moisture content for 36 hours in the shed can be as high as 60-70%. The actual dryness which lumber will reach is about 10½-12%, but this requires much more time. The 12% figure is based on an almost constant wet bulb depression of 12 deg. F. During a recent four-hour check a constant difference of 12 deg. F. was held. Maximum dry temperature was 86 deg. F.

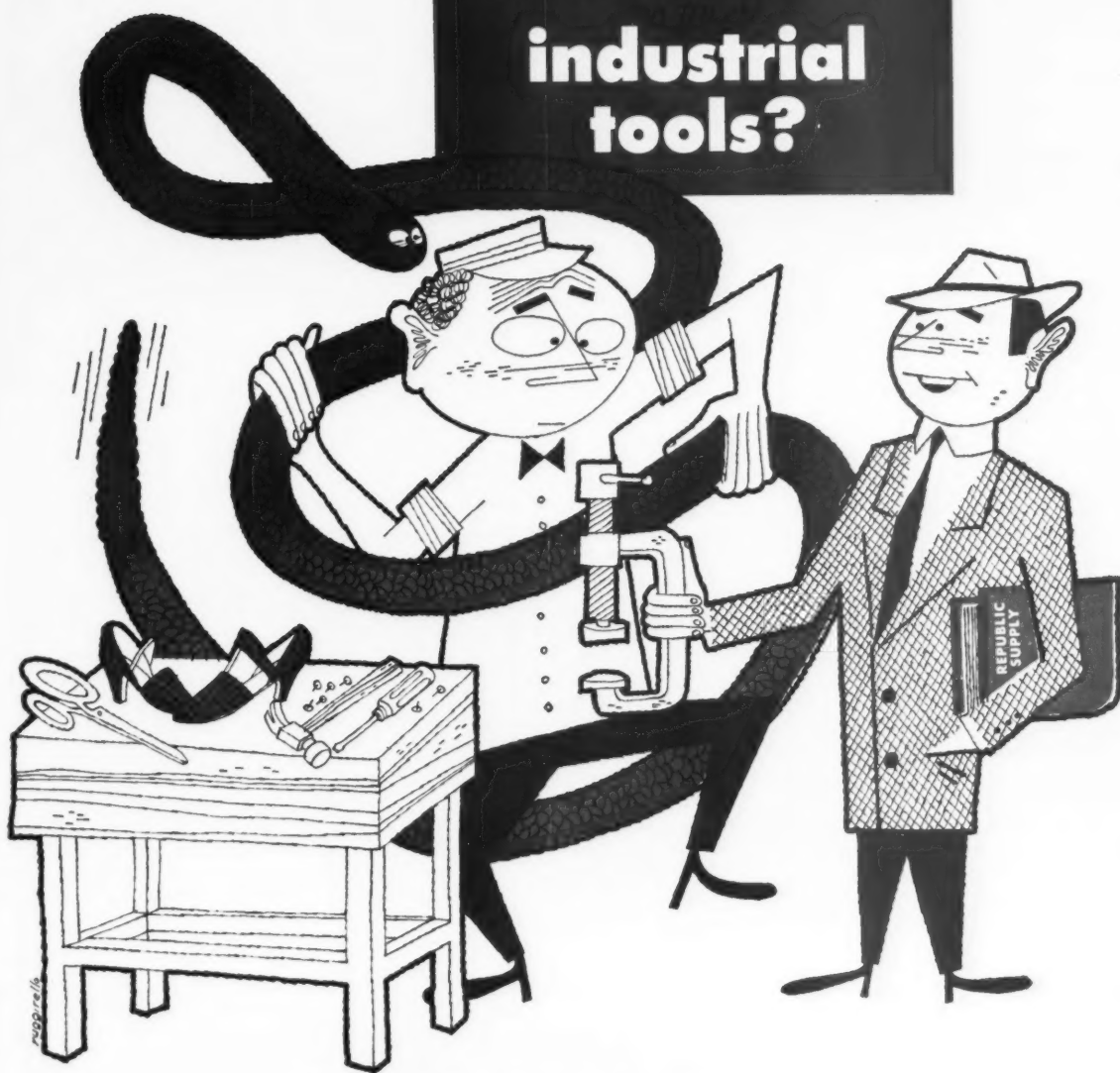
Shrinking is of no importance unless the lumber has not been dried properly before surfacing. Lumber that has been surfaced at 25% moisture content still has 100% of its shrinkage left. A 12-in. pine board can shrink as high as 8% when cut tangentially.

Checking is serious and occurs in

EXTERIOR view of pre-dry sheds. Fully equipped sheds cost far less than a new kiln and allow double its production.



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a high percentage of lumber some seasons in the air drying yard. A large amount of surface checking is present in this air-dried lumber. We have a negligible amount of surface checking in our kiln-dried lumber.

Circulation

Fans are mounted approximately at the center of each crib in the shed. There are eight fans in all. Each bank of fans (two per bank) is located on 31-ft. line centers across the building, forming three double-track rooms. Fans are reversed on the same time interval as the kilns. The air is baffled at the top and bottom of the cribs. End baffling caused a drop of approximately 38 fpm. across the load, so we decided against it.

The average flow of air across the cribs is 135 fpm. This average is compiled from all points in the crib and includes all points where the circulation is at a minimum. The air circulation through the center of the crib is approximately 180 fpm. These figures are compiled with a volometer after the lumber has been in the sheds from 24 to 30 hours.

Heat was still another problem we had to cope with. Four upright coils solved our problem, except that feed operation caused us some grief. Of the four coils we built, two had 27 lines and the other two 16 lines. The coils with 27 lines were installed on the outside walls to do the main bulk of the heating. We found this quite important on cold, windy days.

The 16 line coils served as booster

coils in the center of the sheds. Each coil was 31 ft. long, the pipe was on 5½-in. centers, and the headers were 2-in. pipe. The pipe makes a straight pass from one header to the next. These coils included 2,550 ft. of 1-in. fin pipe for approximately 105,000 fbm. of lumber. Steam pressure in the shed is approximately 100 lb.

Coils were located approximately 24 in. from the cribs and 18 in. off the ground for the large coil. The two small inside coils are approximately 40 in. off the ground and all coils clear the fans by 6 in.

There may be some question as to the use of small coils in the center of the sheds, but we felt that since none of the air is recirculated, the only heating necessary is to compensate for the cooling of the air that passes through the cribs. In many cases there is a difference of 80 deg. between the outside air and the leaving air temperature. For even drying certainly there would be little justification for large center coils. Temperature checks bear out validity of small center coils.

Temperature checks in the shed, at approximately 24 points in each crib, show an average of approximately 80 deg. F. The low is about 72 and the high 86 deg. F. Since we are not interested in temperature above 100 deg., this is proving quite satisfactory. Temperatures were determined by the use of a maximum reading thermometer on the leaving air side. The average drop across the load is 10 deg. F.

As can be seen, this circulation (180 fpm.) and temperature (86 deg.

F.) at a low relative humidity can handle a large amount of water leaving the lumber. Many tests have shown a 22% drop in moisture content in 12 hours. This is quite helpful when trying to even out the moisture content of a charge with a good deal of bullpine. We have managed to reduce the moisture content of a charge of 6-in. common to approximately 31% by pre-drying 60 hours behind selects. This of course helps us to determine our fiber saturation point and get up to a high temperature in a short time.

Knots

The most noticeable thing about the quality of lumber is the condition of knots. We find a higher percentage of our spike knots hold without serious check. The round knots are also better. Besides this, we can determine our fiber saturation point with greater accuracy, which is quite helpful in turning out a better product.

The 50% increase in kiln production which we achieved in January and February has certainly justified the expense of the sheds. Compared to the cost of a new kiln, they were very worthwhile. The fans, motors, and coils cost approximately \$2,200, while a new kiln with 34-ft. double track, fans, and equipment, would have cost around \$6,500. The building cost was approximately the same, but the resulting production increase has been nearly twice as much as a new kiln would produce.

Engine mover

WHEN THE FIRST DC-7 Mainliners were introduced into United Air Lines Service, the big Wright turbo-compounded engines of the aircraft posed a problem for shipment on the company's DC-4 Cargoliners.

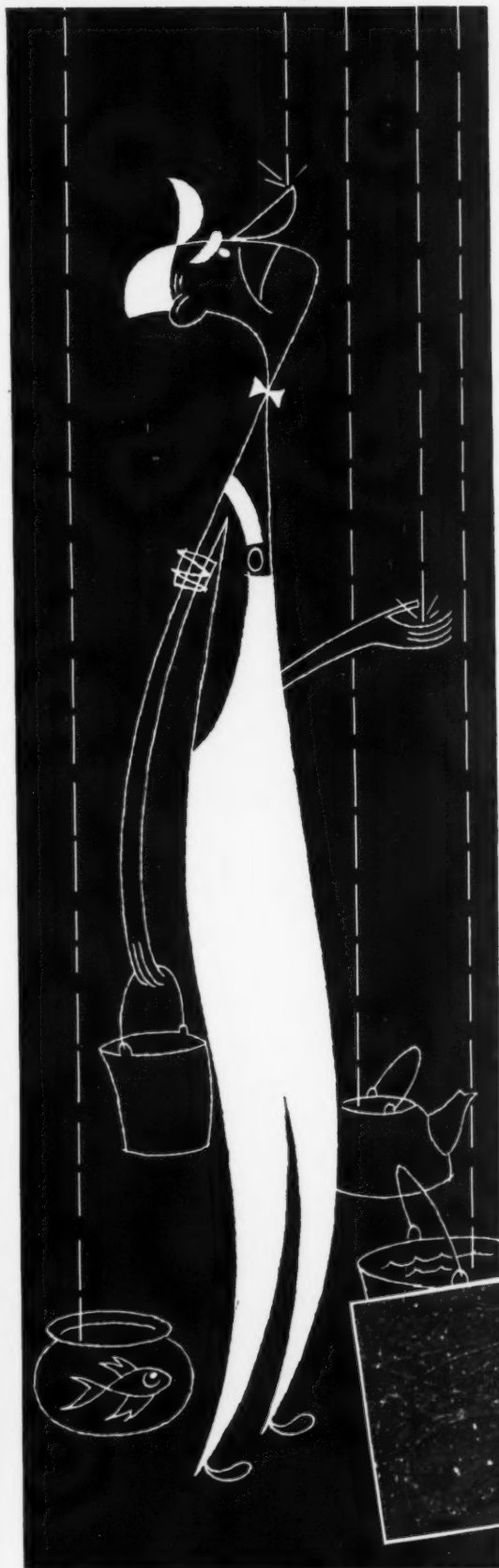
Engineers at United's San Francisco maintenance base undertook the development of a new stand to provide necessary clearance and at the same time possess mobility.

When an engine has cleared the doorway, the stand is jacked up and its castors lowered. Block and tackle are then used to pull the stand to a predetermined position, where it is bolted securely to the aircraft's floor. The stands, which clear the Cargoliner's door by less than an inch, allow the loading of one of the DC-7 engines within 12 minutes.



CLOSE-UP of shipping stand shows built-in jack. Immediately left of jack is retractable castor which will be lowered into

place when forepart of engine clears door. Similar jacks and casters are in place at three other corners of stand.



† NO WARRANTY IS IMPLIED. ANY BUILT-UP ROOF IS SUBJECT TO CASUALTIES DUE TO CAUSES OTHER THAN FAILURE OF THE ROOFING MATERIAL ITSELF AND NO REPRESENTATION IS MADE HERE TO SUCH FAILURES.

Looking for INSURANCE against leaks?

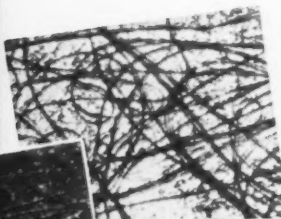
The best POLICY† is to start with a good built-up roof—one using Fiberglas* Perma-Ply. This new development is a reinforcing material for built-up roofs which has no equal for durability—fibers of GLASS. Next in importance is proper application—the kind of job you get by using the Approved Fiberglas Built-Up Roofing Contractor in your community. You just can't beat this combination to provide maximum protection—for the *builder*—for the *owner*—for *you*!

OWENS-CORNING
FIBERGLAS
FIBERGLAS CORPORATION

Perma-Ply

TM. O. C. F. Corp.

* FIBERGLAS IS THE TRADEMARK (REG. U. S. PAT. OFF.) OF OWENS-CORNING FIBERGLAS CORPORATION, FOR A VARIETY OF PRODUCTS MADE OF, OR WITH FIBERS OF GLASS.



FIBERGLAS MAT + ASPHALT = PERMA-PLY
LEFT: Fiberglas reinforcing mat before asphalt is applied.

BELOW: Finished product after mat is saturated in asphalt.

Fiberglas PERMA-PLY is furnished
5 squares per 36" roll (540 sq. ft.).

SEND FOR ALL THE FACTS

OWENS-CORNING FIBERGLAS CORPORATION
Pacific Coast Division • Santa Clara, Calif.

Gentlemen:

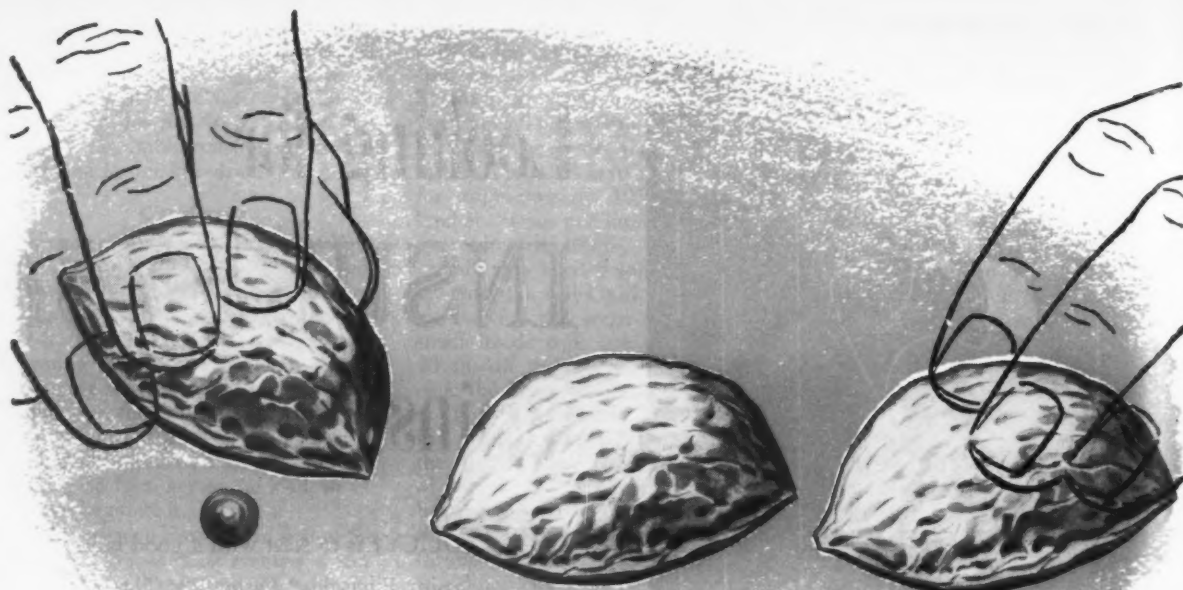
Please send me specifications and a sample of
Fiberglas PERMA-PLY along with names of
Approved Contractors in my area.

Name _____

Address _____

City _____ State _____

For more details circle No. 41 on Reader Service Postcard



THEY MAY LOOK ALIKE

...but there's a big difference underneath

And it's the same way in buying carbon or alloy steel tubing. Lots of it looks very much like OSTUCO . . . but underneath it all there are these advantages that save you money:

OSTUCO provides a single source service . . . complete manufacturing, fabricating and forging operations under one roof mean one purchase order takes care of all details. And you can depend on deliveries as promised. OSTUCO'S flexibility assures the same efficiency and economy in both large or small production runs. OSTUCO'S quality control maintains uniformity of structure from raw materials to finished product.

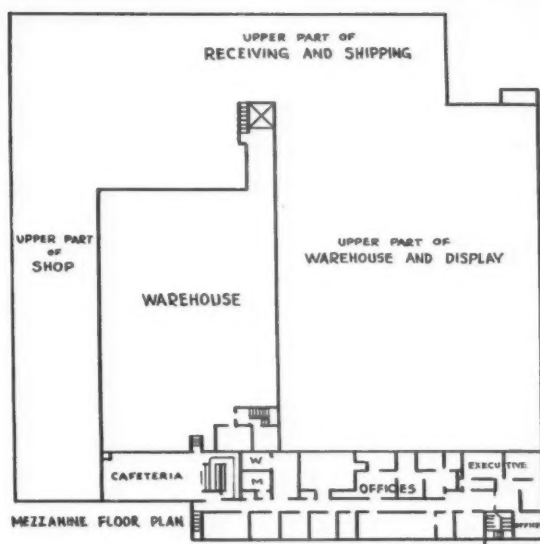
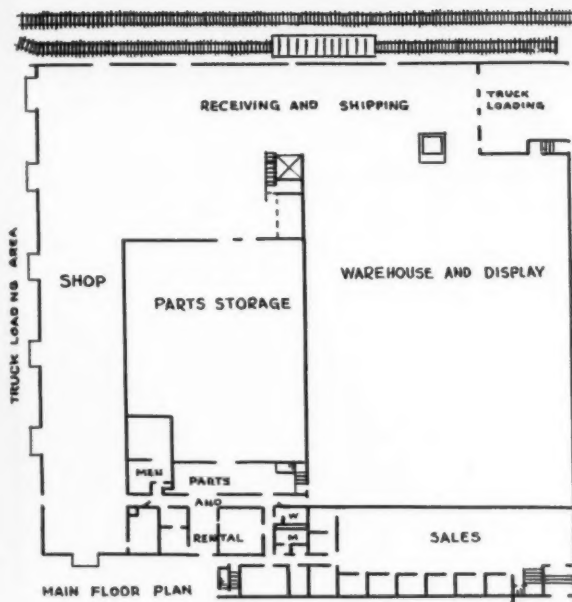
The complete story as outlined in an informative booklet, "OSTUCO Tubing," is yours for the asking. Or better still—for conclusive proof—send us your blueprints for prompt quotation.



OSTUCO TUBING

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ELECTRIC WELDED
STEEL TUBING
—Fabricating
and Forging

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of Copperweld Steel Company • **SHELBY, OHIO**
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SALT LAKE CITY, 1361 Stratford Avenue, Telephone 84-1662
SAN FRANCISCO, 681 Market Street, Telephone Exbrook 2-7017
SEATTLE, 3102 Smith Tower, Telephone Seneca 5393
CANADA, RAILWAY & POWER CORP., LTD.
EXPORT: COPPERWELD STEEL INTERNATIONAL COMPANY
117 Liberty Street, New York 6, New York



MAIN and mezzanine floor plans of Star Machinery Company's new headquarters in Seattle, Wash.

Uniformity of design keeps plant flexible, costs moderate

20th article in Western Industry's plant construction series

Who did it

Architects	Decker & Christenson
Professional Engineers.....	Bouillon & Griffith
General Contractors.....	Cawdrey & Vemo
Steel Fabricators.....	Pacific Car & Foundry Co.
Mechanical Contractors.....	Eckart Brothers
Electrical Contractors.....	Industrial Electric Co.

operation, allows amortization within 10 to 12 years.

Star Machinery was founded in 1900 to serve the Northwest's industrial requirements for mill and wood-working machinery, electrical machinery, construction equipment, machine tools, and industrial equipment.

Location

The new building site is a 2.43 acre plot in Seattle's south industrial section adjacent to rail facilities. These include loading and unloading equipment to handle 6 cars at a time at floor level. There are also facilities for truck loading and unloading at bed level and ground level for easy handling of all types of equipment and materials. A parking area of 24,000 sq. ft. is designed to accommodate approximately 70 cars.

The total floor area of the building covers 1.86 acres, and consists of a two-story office area of 19,000 sq. ft., a display area of 19,000 sq. ft., ware-

WHEN four separate operations can be corralled peacefully under one roof and still keep out of each other's hair, the plant's business is bound to be more efficient and economical than would otherwise be possible.

The thing that makes this work is uniformity of design.

Functional uniformity at a moderate cost is just what Star Machinery Co. was aiming at when they recently built a new combination office building, warehouse, display center, and

shop at a location in Seattle, Wash.

Uniformity was the watchword in both design and construction of the new building which features a 4-ft. 6-in. module for economy in both office and plant, steel frame construction keeping all girders the same depth, resulting in a uniform ceiling level for operation of cranes, walls of both poured and tilt-up concrete, and a flat tongue and groove roof.

This uniformity of design aided rapid construction of the building and, through increased efficiency of



EXTERIOR view of the new combination building constructed for Star Machinery Co.

house area of 34,000 sq. ft., and shop area of 9,000 sq. ft.

The architects, Decker & Christenson, incorporated the latest in architectural design and facilities to provide flexibility and moderate cost. Among the new plant's innovations are:

1. Modern modular office construction. The office is constructed with a 4-ft. 6-in. module with columns 13-ft. 6-in. apart, allowing room for extra large office equipment.
2. Underfloor duct in offices and display floor for operating demonstrations and displays.
3. A pneumatic tube system for expediting papers from order department to shipping department to accounting department.
4. Color corrected mercury vapor 440 volt lighting in all warehouse and shop areas.
5. An automatic electric-hydraulic elevator for access to crated and packaged merchandise storage.
6. Flat roof construction with special drains for summer flooding and evaporative cooling.
7. Alumilighted aluminum sash, doors, flashings for modern appearance and low maintenance.

Only exterior rolling steel doors require painting.

The accent is on merchandising and service facilities and a spacious lobby permits a view of the large display floor through continuous wall storage cases with jewel box display windows at eye level. A large sales office is beyond the elevated receptionist's desk with division managers' offices paralleling the windows.

Executive office, accounting office, auditorium, and cafeteria are located on the second floor. The cafeteria is fully equipped and serviced by the modern all-electric stainless steel kitchen. The auditorium, usable for both general and sales meetings, is outfitted for projection of sound movies.

Adjacent to the display floor is the receiving and shipping department, flanked by the rail freight doors and truck loading bay where three van-type trucks can be handled within the building. A single rolling steel door closes down the side street and three double roller doors separate the shipping and receiving areas. The shop area at the south bays, adjacent to the

equipment yard, is completely equipped for any servicing or repairs and has two 5-ton overhead cranes running its full length.

Centrally located to the shop, display, and receiving areas is the warehouse area and parts department. Second floor storage is serviced by hydraulic freight elevator and a connecting bridge on which crated goods can be deposited by lift trucks from the first floor.

Warehouse and display floors are sectioned off with colored tape to indicate stock areas, and letters on the walls are used to identify specific 20-ft. areas, making it possible to move crated equipment speedily and safely to any area desired.

Construction

Foundations for the building consist of fully treated wood piling with reinforced concrete pile caps and grade beams. Warehouse, shop, and display floors are 5-in. reinforced ground slab concrete with interlocked construction and control joints. The office section floors are reinforced concrete slabs. The building structural frame consists of structural steel beams and columns fireproofed except at warehouse, display, and shop roof.

South and west walls are 6-in. reinforced concrete tilt-up panels. All other building walls are 8-in. poured

LOOKING through the new plant's sales offices and glassed-in private offices.



PART of the area set aside for display of the company's merchandise.





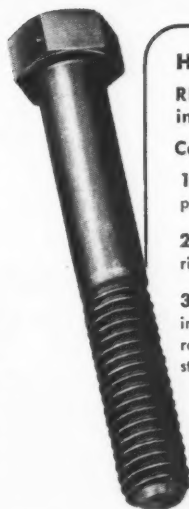
Sure, you'd need special cap screws here!

Some people have strange ideas on tightening cap screws.

Like the manufacturer we ran across recently. His workmen tightened cap screws far beyond their load limit as a matter of course. Naturally, this caused costly screw failures in the field. Also naturally, the boss figured the only way out was to buy expensive special screws with higher physical properties. Just in time, a sharp-eyed RB&W "fastener engineer" pointed out that a high-quality standard RB&W cap screw could do the same job — if the tightening method was corrected.

This incident spells out a cost-saving story for every user of fasteners. Maybe there's a stage in your operation where you're using a fastener designed for a bigger job than you're giving it. So it's important for you to know that an RB&W *standard* screw, nut or bolt can often give you the same dependable service you're paying extra for now. The facts in the box at right make it well worth a phone call to the nearest RB&W office to find out how these very special standards can do a job for you. RUSSELL, BURDSALL & WARD BOLT AND NUT COMPANY, Port Chester, N.Y.

4.4



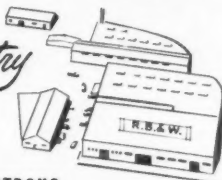
HERE'S WHY...

RB&W standards often surpass industry standards.

Cap screws, for example:

1. They're cold-headed — the process that produces the best bolts and cap screws.
2. Cold-heading requires superior materials — resulting in sounder products.
3. Modern equipment and quality control insures precise sizes, superior finish, accurate threading — for fast assembly and stronger end products.
4. RB&W cold-heads the widest size range in industry.

RB&W *serves Western industry
with the complete quality line*

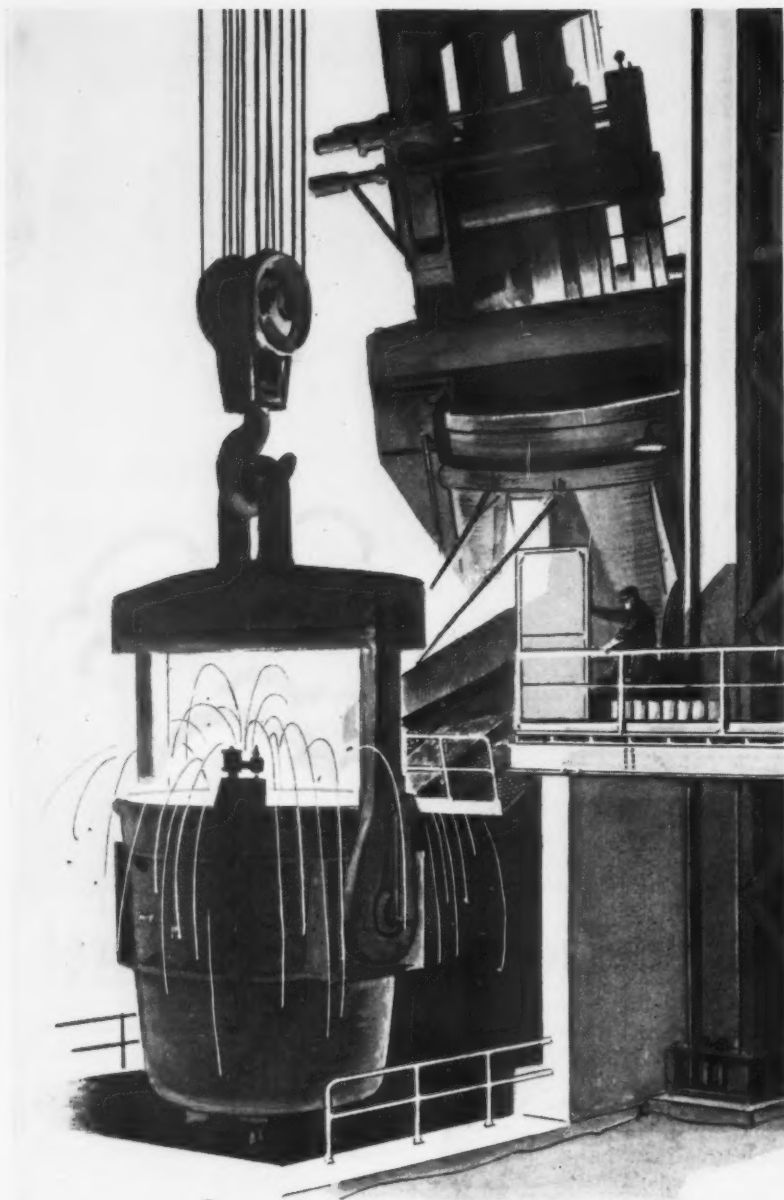


WEST COAST PLANT: 4466 Worth St., Los Angeles, Calif. Other plants: Port Chester, N. Y., Coraopolis, Pa., Rock Falls, Ill. Additional sales offices: San Francisco, Dallas, Chicago, Detroit, Pittsburgh, Philadelphia. Sales agents: Seattle. Distributors from coast to coast.

109 YEARS MAKING STRONG THE THINGS THAT MAKE AMERICA STRONG

For more details circle No. 43 on Reader Service Postcard

September, 1954 — WESTERN INDUSTRY



SERVING THE INDUSTRIAL CENTER OF THE WEST

...the Industrial Business-Minded Bank

California Bank

MEMBER FEDERAL DEPOSIT
INSURANCE CORPORATION

Los Angeles

For more details circle No. 44 on Reader Service Postcard

concrete. The office roof section is of reinforced concrete slab while all other areas are covered with 3 by 6-in. tongue and groove roof decking. The entire roof surface is covered with 5-ply tar and gravel membrane roofing. Division walls are constructed of concrete blocks while permanent partitions are plastered tile, concrete block, and studs filled with gypsum block. Office partitions are generally constructed of 7-ft. high wood panels and glass partitions designed for moveability.

A suspended metal and acoustic tile ceiling covers the office section. The main entrance, floor, and stairway have terrazzo surfaces, and resilient tile flooring serves in the general office spaces.

Heating is accomplished by a central boiler room with hot water boiler distributed by pumps to three zones. The office section is heated by convactor type units while the shop and warehouse area have unit heaters. The office section is ventilated by forced air fans and exhaust fans located in the penthouse. Ventilating air is tempered by heating coils and distributed by ducts to ceiling anemostats.

PALLETIZED LUMBER cuts handling costs

BRIDAL VEIL LUMBER and Box Co., Bridal Veil, Ore., has reduced costs of handling dimension and finished stock by 50% through the use of palletized loads and electric powered industrial trucks.

This producer of cut dimensional lumber for door jambs, window frames, and moldings uses trucks to handle palletized loads of processed lumber, transferring them from production to storage and shipping. Trucks are also used to service production machinery and maintain a maximum flow of materials. This eliminates lost time which may result when machines are forced to wait for loads.

The system has proved suitable in areas immediately adjacent to loading areas where wooden floors subject to outside weather are apt to be slick from melted snow or rain. Before mechanization, when heavy loads were moved by hand, the slippery floor often subjected the product handlers to unnecessary risks.

The two trucks are operator-led Transporters. The weights of unit loads vary from 1,500 to 2,000 lb., depending on the nature of palletized products.



Western Industry asks your cooperation

In The Plant:

1. Have there been any changes in your industry in operating methods which should be reported? Any new types of equipment or materials?

2. What can your suppliers do to provide:

- a. Better raw materials?
- b. Better components?
- c. Better equipment and supplies?

In The Marketing Picture:

3. What new uses for your industry's products should the rest of the West be made aware of?

4. What new markets is your industry reaching? Which should it reach?

In Research:

5. What statistics should we publish about your industry:

- a. On output?
- b. On sales?
- c. On raw materials or supplies used?

In General Perspective:

6. What do you consider to be the outstanding forces, trends, and developments, both in your individual industry and in the West in general, that should be treated in the *Western Outlook* issue?

7. Have we overlooked any important subjects in the above list?

Whatever your function (1) in the company (top bracket executive, midway down the ladder, clear at the bottom rung); (2) a supplier; (3) in a trade association; (4) somewhere on the sidelines—you have specialized knowledge that will aid us in making our *Western Outlook* issue (the annual January Review and Forecast) more sound, comprehensive, and useful than ever before.

We have gone a long way in providing an authoritative and greatly needed annual guide to current conditions in the fastest growing industrial area in the nation. It is widely recognized as a careful, thorough analysis, industry by industry, plus over-all perspectives, a chart for future operations.

But we can always make further improvements and add finishing touches. What help can you provide on the accompanying list of questions?

Address your letter to:

**Western Outlook Research Editor
WESTERN INDUSTRY**

609 Mission Street

San Francisco 5, California

P.S. Perhaps you can use our help also.

The *Western Outlook* issue is in effect a Western industrial conference all its own, with 10,500 buyers and influencers in attendance. Your company is one of the speakers on the program, and you become known to everyone present. If you identify yourself by an advertising message telling what your contribution is to the development of the West.

If you want to be on the program, let us know.

For more details circle No. 45 on Reader Service Postcard

TORTURE TESTS PROVE



BEFORE TEST

Three standard cushion-type solid tires were used in this test. The Monarch Mono-Cushion was selected from stock awaiting shipment . . . competitive tires were purchased from authorized dealers of two other leading industrial tire manufacturers.



AFTER TEST

This unretouched photo shows comparative condition of same three tires after each had undergone an absolutely identical testing procedure. All tests were made the same day . . . using a constant time interval and same testing equipment.

... THE SUPERIORITY OF *Mono-Cushion*[®] INDUSTRIAL TIRES



TEST EQUIPMENT . . . a standard dual-drive lift truck carrying a loaded tote box weighing 4,864 pounds. Deliberate overload of approximately 44% created by mounting a single 22x6x16 cushion tire on each drive wheel (which normally carries dual tires of this size). Overload increased severity of test and accelerated tire fatigue.



TEST PROCEDURE . . . loaded truck was operated continuously at maximum speed for a fixed time interval. Truck's brakes were jammed on periodically throughout testing period to cause sudden stops and create extreme shock loads.



TEST TRACK . . . was a combination of black top and gravel road surfaces to simulate severe operating conditions (for both indoor and outdoor applications). A railroad spur in the plant yard was included in the test pattern.

For more details circle No. 46 on Reader Service Postcard

HERE ARE THE FACTS

THAT MEAN SAVINGS TO YOU



- (1) ONLY MONO-CUSHION SURVIVED THE TEST . . . the other tires were too damaged for normal use. TIRE "A" lost a section of tread 6 inches long and 1 inch deep. TIRE "B" was badly chipped and had two deep splits that reached almost to rim. This is additional proof that *Mono-Cushion* is a better buy . . . it costs less initially and lasts longer.
- (2) MONO-CUSHIONS GIVE YOU MORE TON-MILES PER DOLLAR . . . because the rubber stocks developed especially for these tires are compounded from *higher quality materials than are used in the best "premium" passenger car tires*. This is no idle claim. It is another fact previously known only by Monarch's key personnel.
- (3) MONARCH SUPPLIES PERFORMANCE-PROVEN INDUSTRIAL SOLID TIRES. Working closely with lift truck manufacturers, Monarch engineers have created tire and tread designs that assure maximum cushioning action for vehicles, loads, floors and drivers. A leading supplier of pressed-on tires, Monarch has a type and size to meet every lift truck requirement.

WHEN YOU NEED TIRES, REMEMBER MONARCH
... THE KING OF THE SOLIDS

YOUR NEAREST MONARCH TIRE DEALER is listed in the Yellow Pages under "Trucks-Industrial-Parts & Supplies" or "Tires-Industrial". If current directory does not have a listing, write direct for complete catalog and name of nearest dealer.



280 Lincoln Park • Hartville, Ohio
7-253 General Motors Bldg., Detroit 2, Mich.

MAINTENANCE SHOW again next year

A second Western Plant Maintenance Show and Conference will be held in Los Angeles July 12-14, 1955, as a result of the success of the first affair in Los Angeles this year. Pan-Pacific Auditorium has been engaged for the occasion, and Clapp & Poliak, Inc., who put on the show, report that a number of exhibitors have already applied for space.

Attendance at the affair this year was 6,200 registrations, and there were 144 displays. This was larger than the first plant maintenance show put on in the East several years ago, but the Eastern show has grown rapidly, indicating that similar progress will be made out here.

The conference, held at the Ambassador Hotel, attracted 250 maintenance executives, and L. C. Morrow, conference chairman, felt that attendance next year would be around 600.

ASTE show and meeting in the West

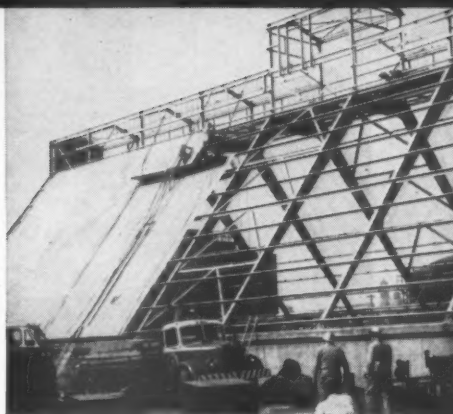
The American Society of Tool Engineers will hold its first ASTE Western Industrial Exposition March 14-18 at Shrine Auditorium in Los Angeles, simultaneously with ASTE's national meeting. Both exhibits and conference sessions will be tailored to Western needs and conditions.

As reported by Joseph P. Crosby, president of ASTE, the society first studied the pattern of Western industry, then consulted with representatives of various branches of industry in the West to develop a picture of what processes, machines, tools, etc., held greatest current interest for Western companies. The show committee is composed almost exclusively of individuals familiar with Western industrial concerns.

"The weakness inherent in national shows with regard to the effect of geographical distances," says Harry Conrad, ASTE executive secretary, "is revealed in the fact that of more than 10,200 companies represented in the attendance at the last ASTE Exposition, only 187 were strictly Western.

"Distance involved, time to be taken from regular duties, and the cost of making the trip, all militate against high Western attendance at Eastern and Middle Western shows despite the high level of interest."

Needs of Western industry are being kept uppermost in planning the simultaneous technical sessions, according to Mr. Conrad.



BY DESIGNING storage facilities for material to be stored, Filtrol Corp. has solved a number of bulk storage problems.

NEW IDEAS in bulk storage

SOME NEW SOLUTIONS to the many old problems of large-scale storage of bulk materials are incorporated in a new type storage building recently erected for Filtrol Corp., in Vernon, Calif. Maximum of 10,000 tons of chemical fertilizer will be housed.

Simplicity, speed, and economy of construction with maximum live and minimum dead storage space was the aim of the designer, Clarence V. Thomas, Pasadena, Calif. Two straight flat-roof structures running to a flat peak in the center were the answer to the need for covering cone-shaped piles of material with a minimum of wasted space. The normal angle of repose of the chemical to be stored is sligher than that of the roof planes.

This arrangement insures against contact between roof and stored material, although the structural steel roofing is treated to resist the effects of the chemical. Due to the chemical's severe corrosion action, Transite was selected in place of metal for the roof and end covering. The monitor section houses a belt which picks up material brought from an adjacent mill and dumps it on the storage deck from either end of the conveyor. This allows control of material placement.

Four openings in the storage floor will feed the stored chemical to a sub-floor conveyor belt for elevator delivery to the roof, and from there via belt to the bagging building. In case the material will for some reason not flow freely, a bulldozer may be brought in by way of a ramp which leads into one end of the building and descends to the storage floor. With the bulldozer available, material can be quickly reclaimed, delivered to a 12 x 15-ft. concrete elevator shaft constructed for this purpose, and raised to the roof and out of the building.



A BRIEFING session on the subject of "Job Evaluation" in the auditorium of the Mountain States Employers Council's new building in Denver, Colo.

Educational conferences meet management problems

FROM 15 to 100 management men and women from a wide variety of Mountain States industries meet together in conference at least several times a month to work out their mutual problems of workmen's compensation, job evaluation, communications, safety, merit rating, discipline, group incentives, testing, economic education, turnover, cost control, foreman training, and many others.

These frequent conferences grew out of an annual management conference begun in 1950 and are attended by the members of the Mountain State Employers Council, Inc., whose brand new headquarters are located in Denver, Colo.

Length of sessions varies

Sometimes conference programs are day-long affairs. In this event, authorities from outside the area may be brought in to speak. More frequently, the meetings are scheduled to run from two to three hours.

Panels of Council member executives may discuss the problem at issue, or staff members may do special research and make formal presentations, or the meeting may be run as a conference, with full group participation.

Aside from these pre-announced programs, there are many other meetings going on in the Council building. Small groups of company representatives will get together for discussions of particular subjects which lack broader interest; executives of certain industries or businesses, such as mining, restaurants and hotels, department stores, or the metal trades, will meet to share information or solve

common problems in employee relations.

In between these meetings, staff members follow up with consultations and field work with member companies. In the last two years, for example, there has been a growing interest in supervisory training. The Council staff, equipped with films, slides, and slapboard and blackboard aids, or by simply using conference

techniques, carries on an increasing number of worthwhile programs.

During an average day, a staff member of the employee relations section may work on such diverse projects as preparing an employee handbook, conducting a foremen's meeting, sending out bid requests for a proposed insurance plan, advising an employer on a testing program, and framing a letter requesting a special ruling from the U. S. wage and hour office.

This year there is a new type of activity, which includes an "institute" on interviewing, where employment interviewers will be taken through a course to develop better techniques.

Library maintained

In addition to such group activities, the Council maintains a large library of employee relations material, and reports new developments and discusses current topics in a bulletin sent bi-weekly to its members. Special bulletins are prepared for companies engaged in retail trade and for those participating in a turnover control program.

The primary goal of the employee relations program is the reduction of cost and the increase of efficiency through better employee morale. Says Richard W. Wright, Council director of these activities, "In a competitive market, and particularly as competition is growing more intense, business must inevitably turn more and more to the capabilities of its employees to produce efficiently.

"This largely untapped reservoir of potential savings can be released by the effective use of proper personnel policies. Our job is to explore, explain, and help install these policies for the financial good of our members."

The organization

Mountain States Employers Council, Inc., Denver, was originally conceived in 1939 by a group of Denver businessmen to negotiate union agreements and this is still its major function. In addition to promoting labor-management good will, the Council is in part responsible for the industrial growth of the area it serves—Colorado, New Mexico, and Wyoming.

The Council avoids politics and lobbying although it does keep its membership advised of laws and regulations affecting labor. In 1950 the organization held its first annual management conference and since that time has devoted much of its effort to solving basic problems of human relations between employer and employee. Aside from these functions, the Council prepares statistical data and wage surveys. In 1953 there were only six relatively minor strikes among a membership of 500.



"Since being rammed with Permanente 165, this open hearth bottom produced 18,130 tons in a 30-day period — 500 more tons than this furnace ever has produced." How? Less down-time!

This report from a leading steel mill is only one of the many proving how the superiority of Permanente 165 ramming mix results in increased production and lowered costs.

Permanente 165 is a high MgO periclase material of high refractoriness that is self-bonding by crystalline growth. Impurities are minimized because no sintering agents, no low melting fluxes are present.

Its high density and absence of shrinkage cracks and connected voids give a greater resistance to the chemical attack of iron oxide and basic open hearth slag.

Upon request, your Kaiser refractory engineer will promptly offer you research, design and installation service to help you obtain more steel tonnage, and improved quality—at lower bottom cost per ton.

Call or write Chemical Division, Kaiser Aluminum & Chemical Sales, Inc. Regional Sales Offices: OAKLAND 12, California, 1924 Broadway; AKRON 8, Ohio, First National Tower Bldg.; CHICAGO, 518 Calumet Bldg., 5231 Hohman Ave., Hammond, Indiana.

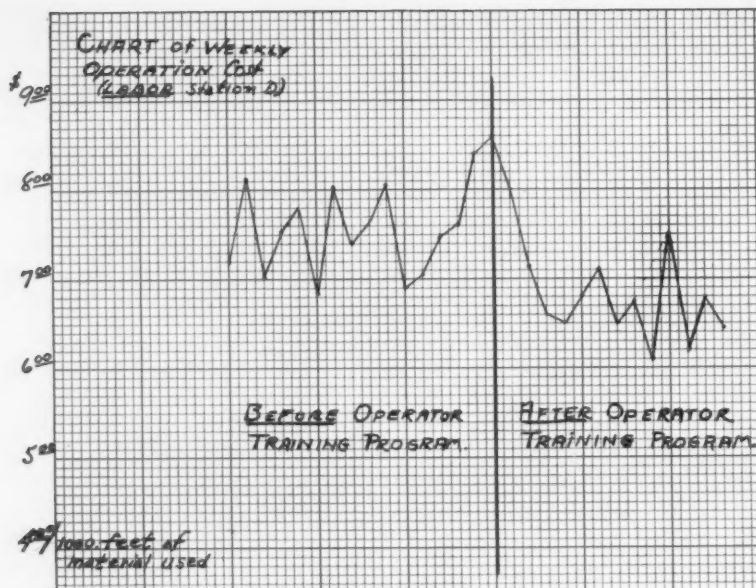
Kaiser Chemicals



Pioneers in Modern Basic Refractories

Refractory Brick and Ramming Materials
Dolomite • Magnesia
Magnesite • Alumina • Periclase

For more details circle No. 47 on Reader Service Postcard



VALUE OF TRAINING is readily apparent from a glance at this graph. Careful instruction cut labor costs by nearly \$1 per 1000 ft. of raw material used at this one station.

Training doesn't cost

By JOHN B. CALHOON

Director, Western Division
Training Within Industry Foundation
Manhattan Beach, Calif.

NOT long ago a Western manufacturer ran a cost accounting analysis that showed an uncomfortable increase in labor costs. A physical analysis of the operation revealed an increasing quantity of the less profitable end products with a corresponding decrease in production of the most profitable end product.

The critical point in the operations was a station where eight workmen's performance determined whether the raw material would go into a high recovery item or into an item of less value, or into waste. And there was no way of positively determining which workmen were turning out the best quality.

All eight workmen were experienced, the youngest having eight years service and the oldest having over 20. There was ample manipulative skill in each workman. And the machines, tools, and supplies used on this non-manufactured raw material were unchanged, as were the speeds and feeds of material.

However, although the raw material was the same, the end product manufactured from it had been completely changed some six months before. Discussion with the workmen and their supervisor revealed that neither had been given any new training relative to processing the raw material for the new end product. Job knowledge, end product knowledge, and daily production information were not being provided.

The workmen were doing their best but were unsure as to whether their best was right or wrong. Consequently, they did not feel particularly secure in their jobs or happy with their supervision.

A solution

Management decided to give the workmen's supervisor additional training in a "job instruction program," developed by the TWI Foundation. At the same time it was decided that the supervisor would be given adequate time to apply his training to the problem at hand.

The supervisor came up with the following inexpensive but realistic and profitable solution:

1. A training workbench was set up in a little used part of the plant and the supervisor made dry runs on ten different batches of the raw material to establish the best possible moves and thus obtain the maximum value from each batch. The best possible moves being established as par, each move was made on the basis of the varying quality factors peculiar to the raw material and the production specifications set up for that specific day.

2. Each workman in turn was brought to the training workbench and allowed to make his own dry run on the same ten batches the supervisor had used.

3. The supervisor then compared each workman's score with the par score established. He complimented each workman when par was beaten and used below par scores as a guide in discussing each wrong move, discussing how such moves cut down quality production. Workmen were then shown how to make the best moves.

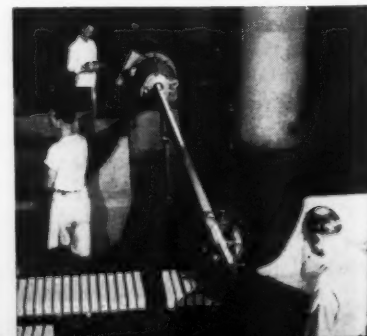
4. The supervisor also used this time and opportunity to enlarge his workmen's product knowledge and job information.

5. Dry run training was given every two weeks for three months and once a month thereafter. The same training was subsequently given to any new man on this job. Time required for each dry run session was only 30 minutes and the batches used were returned to the production line when the sessions were finished.

Labor costs immediately began to decline and the quality of the most profitable end product items went up 20% within two weeks of the first training session.

Each of the workmen involved was pleased with the training sessions and management, supervisor and employee relations improved immediately to a marked degree.

AN OPERATION similar in nature to that described is the slicing of soap bars into cakes at Procter & Gamble, Long Beach.



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President, Ford Motor Company



"In the most practical way possible—the regular purchase of U.S. Savings Bonds—millions of Americans are demonstrating complete confidence in our form of government. Investors in democracy, they are freely staking their personal security on a fundamental faith in the future of our nation. I am proud that today more than 57,000 Ford Motor Company employees are participating in the Payroll Savings Plan. Last year they bought bonds worth \$25,000,000 at face value, and this year the total of their purchases will be even greater. Through their thrift they are helping to keep America strong."

Few investment groups are as important to America as the members of the Ford Payroll Savings Plan. They are *important* in size—57,000 men and women... important in buying power—they actually purchase \$25,000,000 in Savings Bonds every year... and *very* important to our economic stability—"through their thrift they are helping to keep America strong."

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It was relatively easy for Ford, and it is easy for any company, large or small, to build a good Payroll Savings Plan if—(1) The head of the company recognizes the importance of the Payroll Savings Plan to the employees, the company, and the country; (2) If

he will show the same degree of personal interest that Mr. Ford takes in the Ford Payroll Savings Plan.

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Materials Handling briefs

... from the Packaging & Materials Handling

Institute held in Los Angeles, June 1954

Grain conveying

By CHARLES F. WILSON

Superintendent, Pillsbury Mills, Inc.
Los Angeles, California

ALL grain elevators use gravity conveying wherever and whenever possible. Most modern storage plants use belt conveyors. To allow discharge of grain to many points, as over a series of storage bins, a device called a "tripper" is used on many belts.

Spiral screw conveyors are still used in many plants where the volume of grain conveyed is not too large. When grain needs only to be elevated, the belt and bucket elevator is universally used.

Use of air for conveying is fairly new in grain storage and not as yet common. There are numerous advantages to using the pneumatic system of conveying, and in some cases it proves to be very economical. However, grain storage plants as a whole have not accepted this form of conveying and will not accept it until it has been improved and simplified.

Three types of bins

Reinforced concrete bins with walls 6 to 7 in. thick are now common in practically all modern storage plants where large quantities of grain are stored. These bins may be built to any size or shape, are very strong, and resist the lateral pressure exerted by bulk grains. They are impervious to inclement weather, fire, or vermin. Their bottoms may be hoppers so that each bin empties completely. With circular bins, interspaces may be used as smaller bins. Chief disadvantages of concrete bins lies in their cost and the fact that they are not suitable for storage of very damp grains.

Steel bins are always constructed in the form of cylinders and elevated from the ground by cross girders of steel or reinforced concrete. They may be rapidly erected at low initial cost,

are fireproof and vermin proof, and are relatively strong provided they are kept well painted to prevent scaling.

Among disadvantages is the fact that outside temperatures are readily transmitted through steel bin walls to the stored grain and often cause it to get out of condition. Such bins have a tendency to sweat and to drop moisture on the stored grain, and they will leak at the seams unless checked and calked constantly. The bottoms of steel bins cannot be hoppers and the bins tend to buckle under changing stresses.

Interlaced wooden bins are still used in some of the older plants, but the fire hazard which they represent has discouraged new construction for some time. However, this type bin is well adapted to keeping stored grains in condition, as wood does not transmit outside temperature changes and does not sweat.

Close watch kept

Close watch must be kept on the condition of grain in storage bins, and this is now handled with a thermometer system that indicates the temperature every 5 ft. from the bottom to the top of a bin. Thermometer readings are recorded daily for each bin and compared with previous readings to ascertain whether temperature within the grain has risen unduly. Bad spots can thus be detected, and incipient deterioration by heating can be checked by turning and elevating the grain before it is damaged.

One of the greatest hazards of grain storage is dust explosion, which occurs when the dust always present in grain combines with air in the right proportion and is ignited by electrical sparks or overheated bearings. To combat formation of this dangerous dust, grain elevators use a tremendous amount of air in suction systems to draw dust out of the working area.

All electrical equipment and motors

are made dust tight to reduce possible electrical sparking, and all plant equipment is grounded to prevent the build-up of static electricity. Anti-friction bearings are used throughout the plant to reduce the problem of overheated bearings. Magnets which pull out tramp iron in the grain protect the elevator against machinery breakdown as well as the hazard of fire and explosion.

Bulk handling

By HOWARD W. FLEET

Material Handling Analyst
Solar Aircraft Co., San Diego, Calif.

MOST efficient handling of raw materials during receiving and storage requires an analysis of the handling requirements for each different type.

1. Bulky, heavy, loose material can be received and stored with bridge or gantry cranes and bucket, belt, or screw conveyors. Receiving department should be located in or adjacent to raw stores, which should be combined with or adjacent to first processing of the material.

2. Sheet, roll, coil, bundled, bagged, palletized, or boxed material can be handled with (a) mobile equipment such as fork lift trucks, tugs, trailers, pallets, and pallet jacks, or (b) conveyors of the belt, slat, overhead, and dragline types.

3. Packaged or boxed items may also be handled by mobile equipment such as the fork truck, pallet, and pallet jack but require skatewheel, slat, or belt conveyors.

Careful study of packaging of incoming shipments will usually indicate a few possible improvements in packing. This is usually advantageous to both you and the shipper. Returnable containers, however, should be avoided except for expensive or perishable material. Packaging should be light and inexpensive to keep its cost per unit of production material at a minimum. A package should receive and inspect with minimum difficulty, should load and transport safely, and store and line feed in a minimum of area. When empty, it should break down for disposal or be usable to move fabricated items to shipping or stores.

When in-process handling methods are planned, the following fundamentals should be considered:

1. The major part of production work is materials handling, not processing.

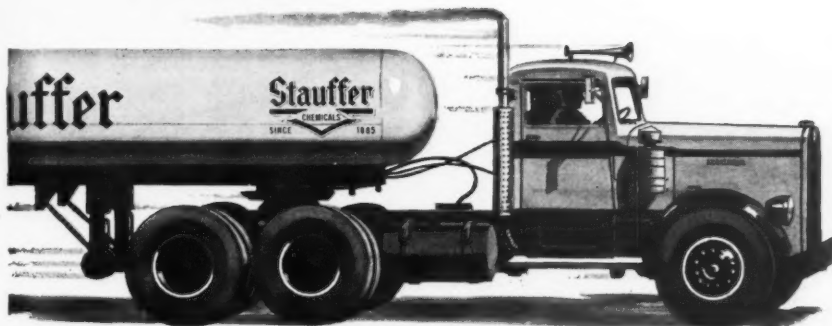
2. Speed of production in a plant

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is determined primarily by the adequacy of its materials handling facilities.

3. Plant layout should provide proper facilities for materials handling as well as processing.

4. A factory building should be designed around the prescribed plant layout.

5. Production influence of a plant is determined by the limitations of its layout.

Manufacturing activities and end

results that are affected directly by the plant layout or the materials handling methods adopted are:

1. Distance traveled by parts in the course of manufacture.

2. Time required for this movement.

3. Number of processing operations and their sequence.

4. Manufacturing cycle of the product.

5. Cost of receiving, storing, and shipping.

6. Cost of transporting materials, manufactured parts, and finished products through the plant.

7. Cost of time lost by workers in preparing and handling material from the machine.

8. Selection of methods and manufacturing procedures or materials handling equipment which permit a worker to become a producer rather than a handler.

9. Installation of safety measures to guard against industrial hazards.

10. Flexibility of plant capacity.



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Testing rack

By JAMES L. MARKIN

Chief Packaging Engineer
Electronics Division, Hughes Aircraft Co.
Culver City, Calif.

THE electronic fire control system we manufacture is composed of about 27 different electronic units, each a different size and shape. After fabrication, these units must be electrically tested — both independently and in unison. During these tests some type of holding fixture is required.

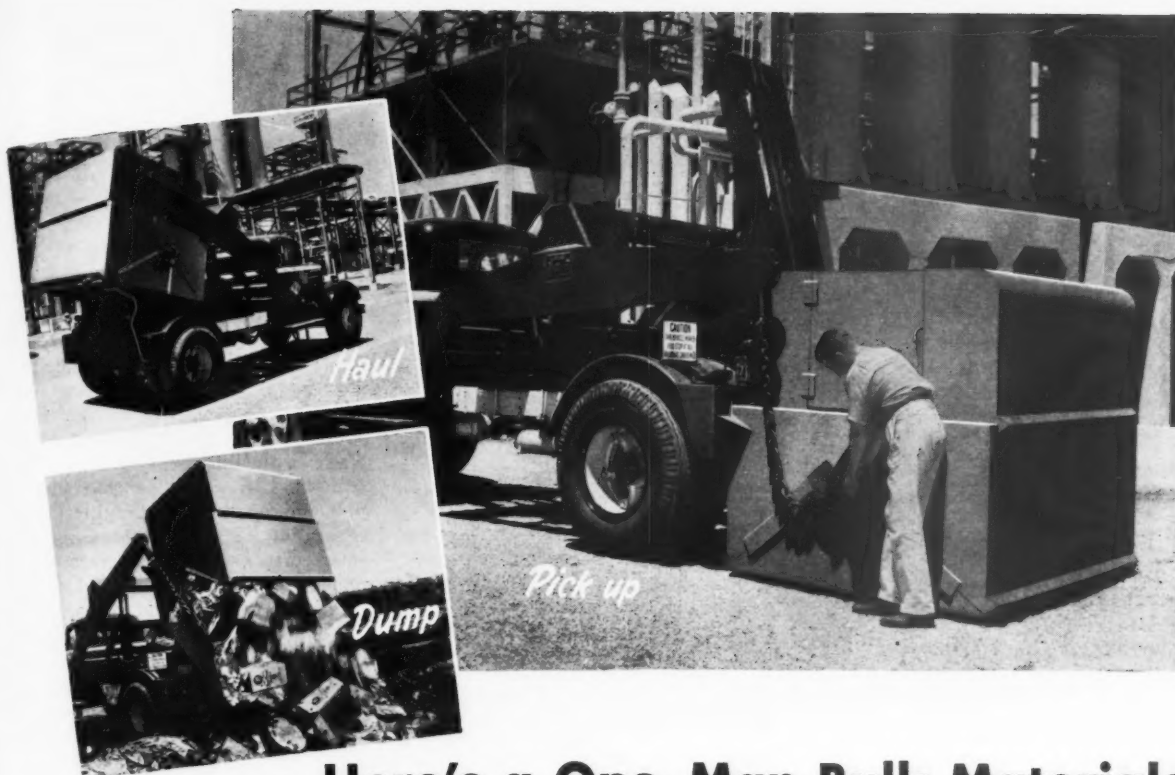
A stationary rack was first considered. It would have been simple to design but created numerous handling problems, such as getting the 27 units off and on the rack, transporting them to and from test area, etc. For these reasons, an expendable combination test and shipping rack was designed rather than a stationary rack.

How it is used

The 27 completed units are transported from their respective production lines to a common stores area, where a complete fire control system is assembled on the test rack, already sitting on a rubber-wheeled cart. The rack is of an open type, leaving all units, when attached, completely accessible from any side. Each rack is also fitted with shock and vibration mounts to protect the system from handling damage.

When the complete system has been checked and found acceptable in the electrical test area, it is rolled into an adjacent shipping area. The test rack, with its built-in vibration and shock mounts, is removed from the rubber-wheeled cart and installed in a specially designed wooden shipping container and the test rack has now become a shipping rack.

A minimum amount of labor and material is required to prepare this complete fire control system for shipment, since the units, after their initial installation on the rack, are never again removed until they arrive at



Here's a One-Man Bulk Materials Handling System for Your Plant...

In the Dempster-Dumpster System of bulk materials handling only one man, the driver of the truck-mounted Dempster-Dumpster, is required for operation. The Dempster-Dumpster serves scores of detachable Dempster-Dumpster Containers. Container capacities range up to 4 times that of conventional dump truck bodies and each container

is designed to suit the materials to be handled—be they solids, liquids or dust . . . hot or cold . . . bulky, light or heavy. You simply place these containers at convenient materials accumulation points inside or outside buildings. When loaded each container is picked up, hauled and emptied (as shown above) or load set down intact. Entire op-

eration is handled by hydraulic controls in cab.

Containers shown below are just a few of the many available or that can be built to meet your needs. They enable you to handle, at tremendous savings, materials of many descriptions—trash and waste materials, raw materials, finished products, etc.—with only one truck and only one man, the driver.

Without question, the Dempster-Dumpster System is the most economical and most efficient method of plant materials handling by truck ever devised!

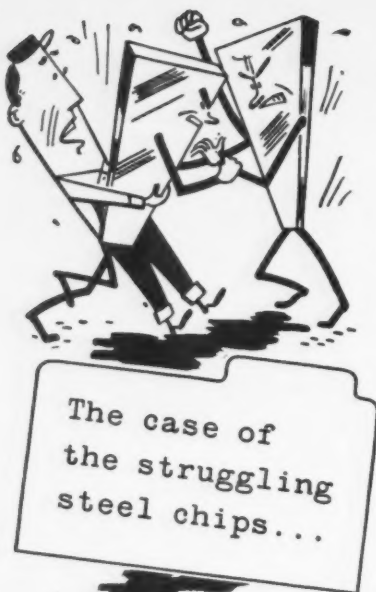
Write to us for complete information. Manufactured exclusively by Dempster Brothers, Inc.



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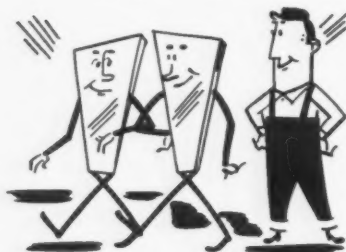
DEMPSTER BROTHERS, 594 N. Knox., Knoxville 17, Tennessee

For more details circle No. 51 on Reader Service Postcard



A Cleveland concern had a really perplexing problem of congested bins. No matter how the steel chips struggled to get through, the result was either a trickle or a complete jam-up.

As luck would have it, one of our men happened along and suggested a CLEVELAND vibrator be installed on the sloping side of the bin. It worked like a charm, and the steel chips struggled no more.



Ever think of a CLEVELAND vibrator for your stubborn materials? Our detailed literature will tell you more about it.

AIR and ELECTRIC



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76

their ultimate destination for installation in an aircraft.

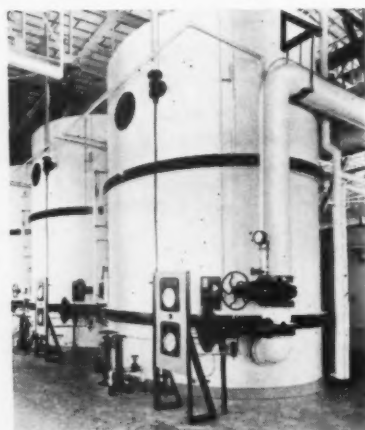
Another packaging problem was found in the handling of the quadruple in-line test cabinet, 9 x 3 x 8 ft. weighing 1,380 lb. and valued at approximately \$50,000. The problem was the necessity of designing a shipping container capable of protecting this cabinet and the delicate electronic equipment it contained. Most of the test cabinet's weight was accounted for by some of the most delicate electronic test equipment in existence. As a further complication, it was necessary for the test position to be calibrated at the time of assembly and to remain calibrated throughout shipment.

Wooden frame

The test cabinet was placed on its back in an inner wooden frame constructed from 2 x 4-in. fir material, with angle-iron corner braces used to strengthen the frame. Five 8 x 8 x 8-in. molten rubber blocks were glued to the outside bottom of this inner frame, and similar blocks were glued to the inside bottom of the outer box. Rubber blocks, 4 x 3 x 3 in., were attached to the remaining 20 corners of the inner frame, and, being glued only to the inner frame, allowed it to move freely in relation to the outer box. The outer box was of cleated plywood construction, the cleats being 2 x 4-in. material and the plywood 1/2 in. in thickness.

VACUUM PANS with automatic valves

AN INSTALLATION of Stearns-Roger Calandria-type vacuum pans, with hydraulically operated 48 in. diam. foot valve in vapor-tight massecuite discharge housing, located in the Holly Sugar Corp. beet sugar factory in the Imperial Valley at Brawley, Calif.



PROFIT FROM WASTE - Gov't technical men get recognition

SUCCESSFUL DEVELOPMENT of a method for commercial manufacture of livestock feeds from pear canning waste has earned a Superior Service Award for a group of research men in the Western Utilization Research Branch of the U.S. Department of Agriculture in Albany, Calif. Their investigations have resulted in a method now in commercial use near San Jose. An important feature of the process is an initial treatment of the waste with lime and steam, which stimulates clumping of the fibrous pulp and separation of the juice. Thus separation of two fractions, a clear juice that can be concentrated to molasses and a pulp cake that can be dried, is accomplished.

Assistant Secretary of Agriculture Ross Rizley, in presenting the award, said the investigation has provided companies that can pears, and also other pulpy fruits or vegetables, with valuable technical facts on the problem of waste disposal as well as a method that produces salable products. It is an important contribution, he said, to the canning industry's effort to cope with the large problem of disposal of waste, which amounts to thousands of tons annually in areas where pear canning activities are centered.

Members of the group who received the award were:

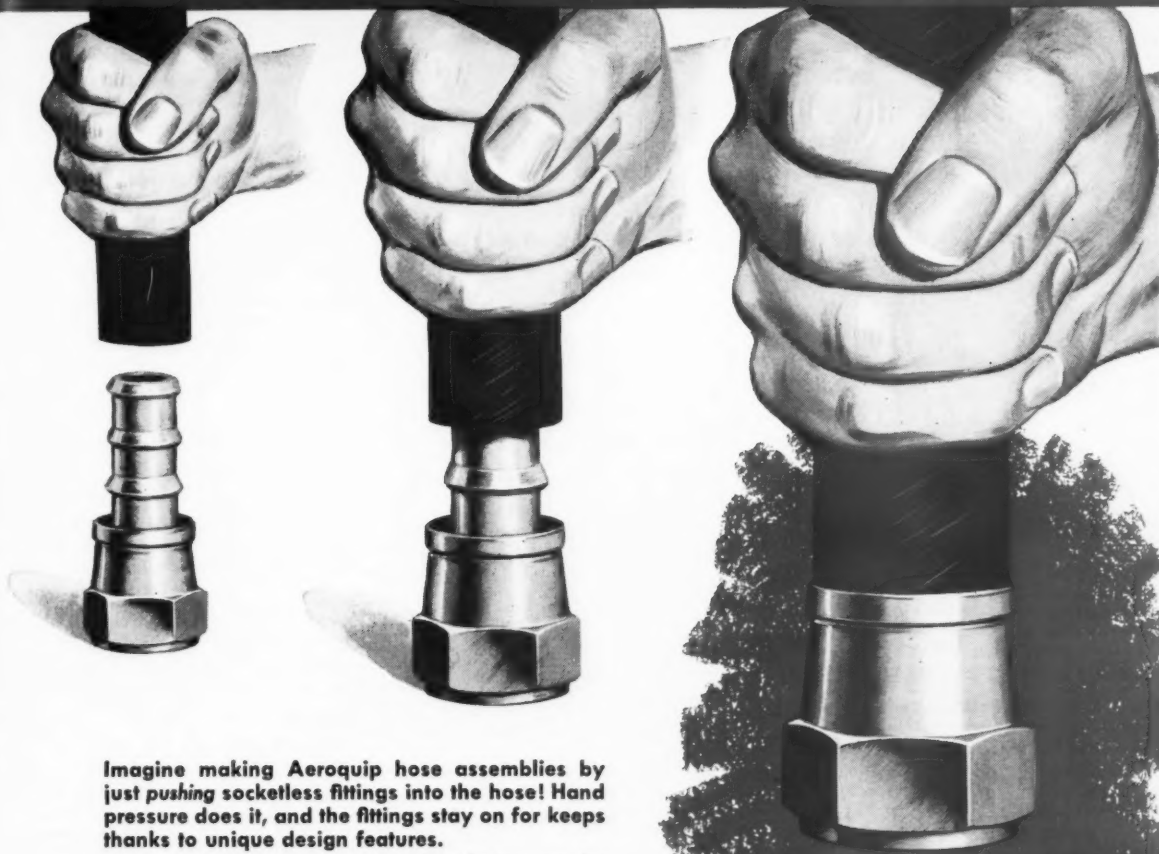
W. D. Ramage, 2314 Marin Ave., Berkeley
A. H. Brown, 725 Ashbury Ave., El Cerrito
H. S. Owens, 1650 Oxford St., Berkeley
R. P. Graham, 7447 Terrace Dr., El Cerrito
A. D. Shepherd, 7465 Rockway Ave., El Cerrito
J. H. Thompson, 1061 Trower Ave., Napa
C. R. Van Atta, Sebastopol
R. H. McCready, 1452 Stannage Ave., Berkeley
J. Guggolz, 695 Mesa Way, Richmond
G. H. Neol (former employee)
N. Fishman (former employee)

During the meeting Mr. Rizley also introduced Gordon Alderton, chemist on the staff of the Albany laboratory, who received a Superior Service Award in a ceremony in Washington, D.C., May 18, presented by Secretary Benson. His award was granted for his discovery and determination of the structure of a new sulfur-containing amino acid in the antibiotic subtilin.

The meeting included presentation of 15 length-of-service awards to members of the laboratory's staff. Staff members who have served 10, 20, or 30 years received certificates and lapel pins.

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September, 1954 — WESTERN INDUSTRY

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Write for free industrial brochure and complete details — in confidence, if you like. This invitation is extended by the City of Long Beach and its Board of Harbor Commissioners.

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SELENIUM RECTIFIER POWER SUPPLIES

PHILIP DIAMOND, president of Perkin Engineering Corp., El Segundo, Calif., speaking before the Electrical Maintenance Engineers Assn. of Southern California on selenium rectifier power supplies, recently stated: "There is a dynamic future in sight for the metallic rectifier industry. The atomic energy industry now has selenium rectifier installations operating on a nationwide basis with current ratings up to 150,000 amps. Research departments are making use of the recent emergence on the scene of improved magnetic materials, higher voltage selenium stacks, and new semi-conductor devices, to enable power supply manufacturers to offer to the electrical industry lighter weight, smaller, and maintenance free units at lower initial cost."

Mr. Diamond explained that a basic metallic rectifier power supply unit consists of: a transformer, a rectifier stack or stacks, and on-off device (switch, circuit breaker, or magnetic starter, etc.) and a housing.

His talk further pointed out that some of the means for converting AC to DC are: (1) hot cathode gas-filled rectifiers; (2) hot cathode high vacuum rectifiers; (3) hot cathode mercury vapor rectifiers; (4) pool cathode mercury arc rectifiers; (5) synchronous convertors; (6) motor generator sets; (7) mechanical rectifiers; (8) metallic rectifier units.

LIGHTWEIGHT TRUCK saves four tons

A NEW TRUCK and semi-trailer combination developed by Insured Transporters, Inc., of San Leandro, Calif., weighs 8,000 lb. less than the average unit without sacrificing speed, power, or maneuverability. Comparatively new metals and alloys, notably Alcoa aluminum and Kaiser-loy steel, replace heavier metals in runways, skids, fenders, wheels, and trailer body to peel off three tons of weight. This makes possible the elimination of a third axle on the truck-trailer, saving another ton.

Lightweight rigs mean less wear and tear on overworked highways, and lightweight construction keeps fuel, license, and maintenance costs to a minimum. In addition, the rig can be pulled by a lighter tractor.

EFFICIENCY KINKS

MACHINERY improves whole-log utilization

A HYDRAULICALLY POWERED log splitter and a 12-foot floating rip saw, both designed and developed by personnel of Weyerhaeuser Timber Co.'s Everett, Wash., lumber division, are improving whole-log utilization and speeding the handling of oversize logs.

Located at mill C, the hydraulic log splitter develops 65-tons pressure using water from the hydraulic barker pumps. It operates on the hydraulic ram principle with the splitter forcing 8-foot logs through four knives arranged in a criss-cross or tic-tac-toe pattern. Logs up to 42 in. in diameter are split to a maximum width of 12 in. Split pieces can then be chipped and conveyed to the pulp mill.

The 12-ft. rip saw is housed in a covered shed mounted on two pontoons which provide a floating platform. Logs are floated into position between the pontoons, locked in place with pins from each side, and ripped down the center by the chain saw which moves the length of the shed on its carriage. Logs 6-ft. in diameter and larger, too big for the headrig to handle efficiently, are halved and then quartered in a fraction of the time it formerly took to do the job.

AIRCRAFT BOLT-PULLER eliminates hammering

THE SEARCH for better methods of airplane assembly has lately resulted in the design of a bolt puller that eliminates the need for hammering. The bolt puller was developed by Convair's Tool Project section, plant two at San Diego, for the delta winged supersonic F-102 interceptor.

A bolt expansion of a slightly lesser diameter than the wing bolt is inserted in the wing root fitting to the point where the attached wing bolt enters the root hole. A nut, washer, and shoulder block are fitted to the protruding end. Then, the wing bolt is drawn smoothly into place by tightening the small nut, eliminating the need for hammering. The only departure from present practice is a change in diameter of threads on the wing bolt, allowing the extension to be fitted.

BOLT-PULLER used on the delta-winged supersonic F-102 interceptor built by Convair.

Contributions wanted

For each contribution to Efficiency Kinks which the editors feel merits publication, WESTERN INDUSTRY will be happy to award \$5.00. Please send in any details of how your plant solved some problem of design, production, maintenance, or process.

If an idea or improvisation saves you time, money, or worry, it may be of interest to others.

We are particularly interested in ideas that contribute to the efficiency of production and the reduction of operating costs, novel or new methods of pollution reduction and waste utilization, as well as adaptation of old tools and processes to do new jobs.

Send all contributions to Efficiency Kinks Editor, WESTERN INDUSTRY, 609 Mission Street, San Francisco 5, Calif.



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SAFETY FIRST for these employees being fitted with goggles.

Compulsory program for eye safety

How eye-safety violations are handled

When a supervisor finds it necessary to discipline an employee, a "Notice of Reprimand" form is used. It is the responsibility of the supervisor to see that this process is properly and effectively carried out. If the reprimand is initiated by someone other than the employee's immediate supervisor, it must be signed by and presented to the employee by his immediate supervisor.

In serving a written reprimand the supervisor will call the employee into his office, and in the privacy of his office advise him of the reason for the reprimand and make sure that the employee un-

derstands the nature of the offense. The supervisor will give a copy of the written reprimand to the employee and ask him to read it to make sure that it states in a clear manner the facts of the case.

If the employee objects to the wording of the reprimand, the supervisor should consider possible changing of the wording, as it is intended to be only a recitation of the facts. Nothing in the wording is to be considered a threat.

If subsequent events prove that the reprimand was given incorrectly, or that it should be corrected, a written report stating reasons for having taken such ac-

SPLIT seconds. That's all it takes. In these fleeting moments tragedy strikes—in the form of lost eyesight.

This happened twice in the San Jose plants of Food Machinery and Chemical Corp. within the past two years. In each case a man lost an eye, an eye that could have been saved with proper exercise of caution and strict observance of safety rules.

Without waiting for another tragedy to hit, the Canning Machinery Division in San Jose launched a compulsory eye protection program on January 18, 1954. While the program had some aspects of "get tough" discipline in its structure, it has proven the only course to safe working conditions for all shop employees.

Program pays off

During the first six months of 1954 not one single serious eye injury was reported. There have been cases of eye ailments reported, but no serious injury of any consequence. Max J. McIntire, safety supervisor, reveals that while it is still too early to feel the full impact of the compulsory program, indications point to a near perfect record for the year unless someone fails to follow the rules.

Before January of this year the company did require employees working on certain jobs to wear goggles. The usual caution signs were posted and the dangers pointed out. After that it was up to the employee to protect his precious eyesight.

Despite the precautions taken, workers had a tendency to become careless about their goggles. "They're not for me," was the attitude taken by some of the men. As a result, eye injuries of

tion must be submitted promptly.

Penalties for violation of company rules or other acts resulting in reprimands are assessed with relation to the effect the violations may have on employee morale, company costs, or customer relations, etc.

A first-time violator is sent home for the balance of the day, and he thereby loses that portion of his wages. A second offense brings a written reprimand, which is served in the privacy of the supervisor's office. If the facts are correct and the employee accepts them as submitted, the violator must lose a week's work.



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For more details circle No. 56 on Reader Service Postcard

various types kept cropping up. Fortunately none of the injuries resulted in lost eyesight.

Then something happened to make people at CMD sit up and take notice. An employee who formerly was employed at CMD had transferred to another division engaged in heavy fabrication work. Well regarded by his former fellow employees, he was a man who, more than most workers, practiced safety and appeared cognizant of all hazards.

One day he removed his goggles for just a second for a closer look and a metal chip flew into his eye. That moment of relaxation from the "wear your goggles at all times" caution cost this man the loss of one eye.

It was regrettable. "If it had happened to someone else, it wouldn't have been so shocking," everyone said. "But to happen to a fellow as safety-conscious as he was makes us think of the problem in a more serious vein."

Decision to act

Canning Machinery Division's management decided to immediately get a compulsory eye protection program into the works. C. K. Wilson, Food Machinery and Chemical Corp. vice

president and manager of the Canning Machinery Division, gave the program his full support.

To protect themselves

He said it was the responsibility of management to help employees to protect themselves.

"In view of the frequency of eye injuries occurring in our own and other plants, the Canning Machinery Division's management deemed it necessary to take some action before tragedy struck our own employees.

"Wearing safety glasses is not detrimental to an employee's eyes and he soon becomes accustomed to having them on. Any inconvenience that might be experienced is a mighty small price to pay to avoid the pain and suffering that must be endured when our eyes are seriously damaged.

"We in management want to help our workers protect themselves by placing proper safety equipment at their disposal. We like to remind ourselves from time to time that accidents not only affect the injured one, but also his family, through inconvenience and loss of income. It therefore seems imperative that every possible effort be

made to see that our workers remain happy, healthy, and physically sound.

"The urgency of a continuous, hard hitting safety program is obvious. No amount of cajoling, lecturing, posters, or pamphlets will help until we become conscious of safety to a point where we begin to practice it instinctively on the job and at home."

Drafting sessions

Department heads, supervisors and personnel directors sat together for months drafting the rules and regulations for such a program. With the ground work done and the program drafted in final form, notices were posted on all bulletin boards and the program publicized in the company's plant newspaper.

Management then called in representatives of Jenkel-Davidson Optical Co. and a plan was outlined for providing glasses to all employees who would be required to wear them in their daily task.

Workers who did not require prescription lenses in their glasses were furnished the glasses at no cost to them whatsoever. Persons who did need prescription lenses were required to pay only half the cost. The company

IN ALL

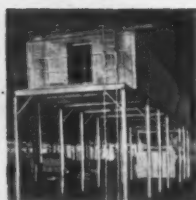
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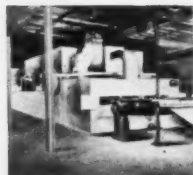
Metal Finishing



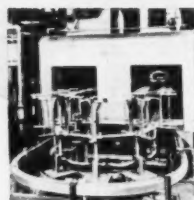
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assumed the other half and made it possible to acquire the glasses through a payroll deduction plan.

Glasses had to be fitted for the employee's comfort. Appointments were made for employees to visit the first aid department, and at the appointed time each man and woman was fitted by representatives of Jenkel-Davidson Company.

This eye protection operation required several days and then came a period of adjustment. Complaints ran from too tight frames to headaches. Some complained the glasses were too heavy and the company produced figures to show that the safety glasses are no heavier than glasses worn in normal pursuits. Those who complained of headaches were advised to consult their family physician or visit an eye doctor to make sure that their trouble was not the result of defective vision.

Company officials felt that these complaints were normal for a large group of people. In a matter of a few weeks the complaints drifted away to a minimum.

Cost of program

Naturally there is a cost involved. Management has set the cost of the program per employee at \$5, a small figure when one considers that the minimum indemnity for the loss of an eye is \$4,000, which, in the case of CMD, is more than enough to cover the cost of the employees coming under the protection program.

This is a hard "dollars and cents" viewpoint, but what is more important is the saving in hardships and suffering that must be endured by the employee and his family.

Even though the value of a protection program is quite apparent, there is always the job of supervision. Like the horse that was led to water, there were still those who wouldn't take the drink. That's where supervision came into the picture. Management had to see that the workers did what was best for themselves.

Earlier in this article, Mr. Wilson talked about a "hard hitting safety program." Specifically, he means one that carries some sort of penalty for willful violators.

"Without some sort of penalty being imposed upon violators, our program would be ineffective. It would have no teeth in it," he pointed out. "Our supervisors are responsible for the enforcement of this compulsory program. Without discipline, no program of this sort will work, but in this case the punishment is mild compared to the crime the violator perpetrates upon himself."

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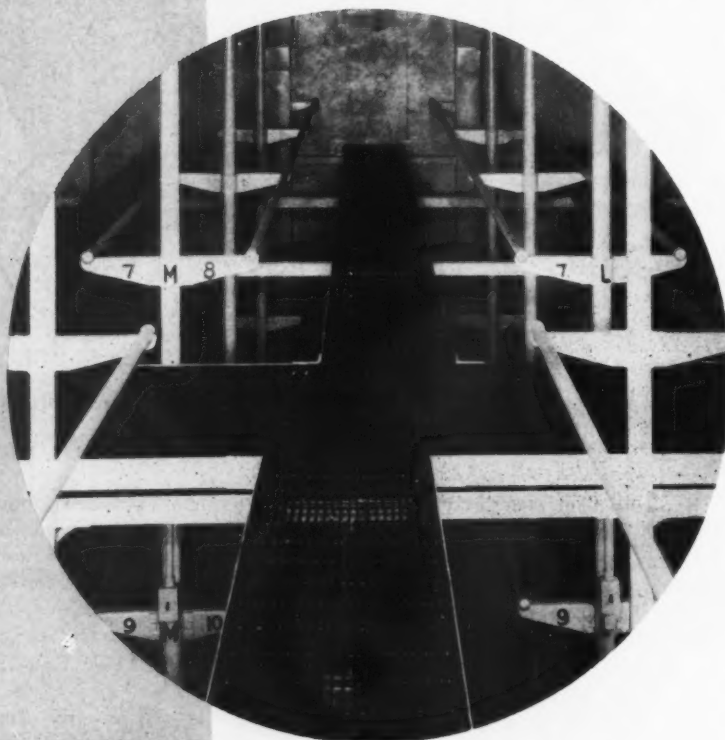
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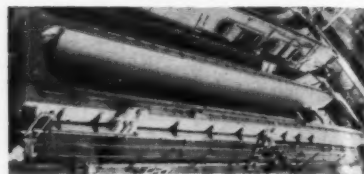
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WEST BUILDS 600-ton crane for East



ONE OF TWO SETS of 300-ton bridge crane girders being built for Moffett Engineering Co., Albany, Calif., for use at Garrison District Dam, North Dakota. The two cranes will be hitched to a single lifting beam with an effective capacity of 600 tons. Structural steel is furnished and fabricated by Moore Dry Dock Co., Oakland, Calif.

HANDICAPPED WORKER wins award

THE ROLE of handicapped workers in business and industry is once again in evidence as the C. A. Norgren Co., Englewood, Colo., awards Glen Powless, legless burr room worker, an award of \$41 and a certificate of merit in the firm's suggestion program. Powless' award came from a suggestion he made for a jig to hold regulator valve cages during the burring operation. The new jig speeds up work and protects the valve seat during the process.

NEW FIREWALLS meet insurance specs

LOW COST, high speed erection of vermiculite plaster firewalls at two California aircraft plants indicates industry's efforts to meet the latest insurance recommendations.

A large open expanse in the Palmdale plant of Northrop Aircraft was bisected by a 55-ft. high fire barrier running the 550-ft. length of the building. A 60 ft. high by 475 ft. long vermiculite firewall also was built at the Douglas Aircraft plant in El Segundo to meet insurance underwriters' requirements. Material for these jobs was supplied by Zonolite Co.

The plastered firewalls break up fire-dangerous open expanses into smaller sections where fires, should they occur, can be isolated and controlled. According to insurance examiners, sufficient fire breaks could have isolated the fire in the General Motors' blaze last summer, reducing the amount of loss.

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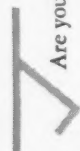
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DIE CASTERS

AT THE RECENT annual joint meeting of the Pacific Coast Group of the American Die Casting Institute and its national directors, it was decided that a joint effort should be made to develop industry standards for its product. Lineal dimensions and tolerances, draft, holes and hole tolerances, flatness, threads, misalignment, concentricity, etc., were considered of primary importance in the standardization program.

The National Institute and the Pacific Coast Group are preparing a purchasing guide which will enable the purchasing agent to analyze quotations on a comparative basis. The purpose of this program is to establish a clearer understanding between the jobbing die casting industry and its customer plants.

DEVICE CUTS labor and damage

R. H. BERG, president of the Port Costa Brick Works at Port Costa, Calif., has come up with a new truck loading and unloading apparatus claimed adaptable to any materials which can be placed on loading pallets. He says that up to three and one half tons per platform can be loaded and placed on a truck with no hand touching it.

Two take-offs utilizing truck engine power are built into a Model 703 Brown-Lipe transmission. The left-hand take-off actuates two lifting arms equipped with lifting chains at rear of truck. Righthand take-off takes care of rollers built into floor of truck and trailer.

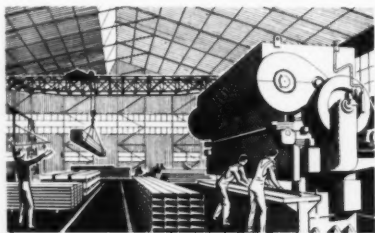
To load, the truck is backed up to a row of loaded pallets. Lifting arms are lowered and the chains grip under each pallet end. Pallet is swung up and onto the transfer rollers. The rollers are then powered, pallet is rolled forward, and another is loaded.

After loading, truck is backed onto its trailer, sprocket wheels on truck's rear and trailer's front are joined by chains, enabling power to be looped to the transfer rollers of trailer. Pallets are automatically rolled to trailer, and truck is unhitched. Pallets are tied down, trailer is hitched on, and load is ready for delivery.

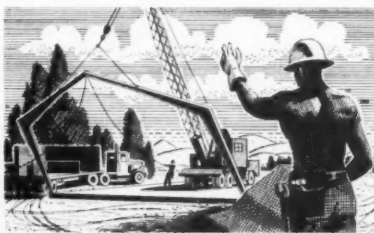
An important byproduct of the method is that loads can be "spot dumped" wherever needed. According to the inventor, his device makes it possible for a driver to load up in 30 min. with no assistance.

For more details circle No. 61 on Reader Service Postcard

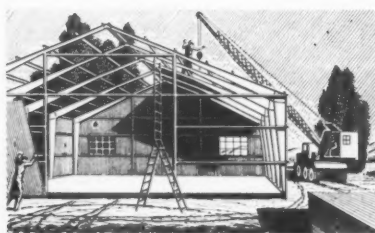
"You can have a new building for as little as \$1²⁵ per sq.ft.!"



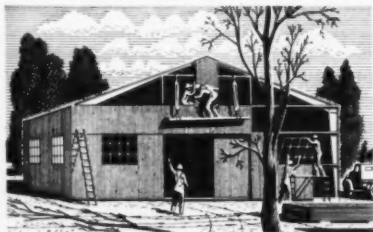
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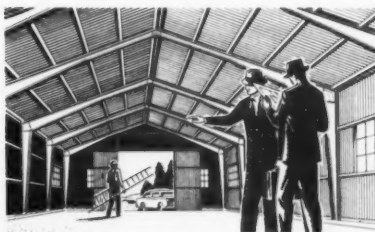
2. The minute your foundation is ready, Soulé trucks arrive with every part of your building. Soulé crews, superbly equipped, begin erection immediately. Coordinated building goes ahead without delays you expect with conventional construction.



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4. Almost finished, Soulé crews install corrugated sides and roof, fit translucent panels to admit glare-free natural light. Soulé engineers make final inspection, to be sure your building is snug, tight, ready for years of trouble-free service. (If necessary, Soulé buildings can be removed and re-erected at a new site.)



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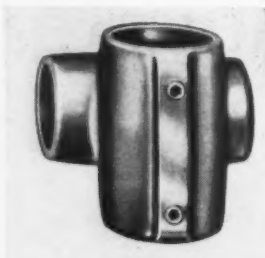
NEW EQUIPMENT & MATERIALS

USE RIP-OUT POSTCARD for more information on products introduced this month

100

Fittings eliminate threading, welding

Nu-Rail Fittings are available in a complete and wide range of I.P.S. from $\frac{3}{4} \times \frac{3}{4}$ to 2x2 in., including reducing sizes from 1x $\frac{3}{4}$ to 2x1 $\frac{1}{2}$ in. They may be used with I.P.S. aluminum, brass, galvanized, or black steel pipe for almost unlimited applications. Five basic types may be used to make nearly every conceivable fitting required. Shown is Nu-Rail No. 10 cross fitting. Circle key number on rip-out postcard for brochure. The Hollaender Manufacturing Co. A.I.A. No. 14.



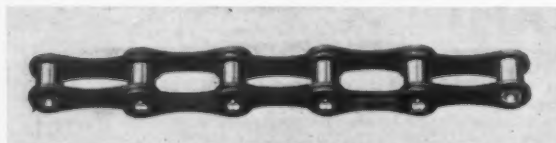
101

Die puller gives greater flexibility

New Barrett 30-Degree Die Puller is claimed to lend convenience and greater ease to a variety of die pulling and other handling operations where narrow aisle conditions prevail. Available in capacities up to 6000 lb., puller is readily converted into a pusher by means of a bar which reverses movement. It enables one man to safely handle large dies and other heavy loads. Operation is automatic. For more information, circle key number on rip-out postcard. Barrett-Cravens Co.

102

Long life roller chains now available

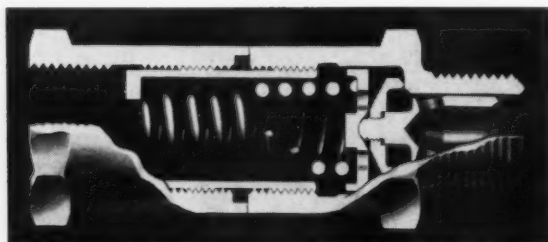


Here is a complete line of double pitch conveyor and power transmission roller chains claimed dependable, long-wearing mediums for light conveying, material han-

dling, and moderate speed power transmission. Chains operate over roller chain sprockets. These are American Standard stock chains, and stock attachments are available for conveyor line. Catalog No. 34 gives more details. For your copy, circle key number on rip-out postcard. The Diamond Chain Co., Inc.

103

Valve series offers mounting ease

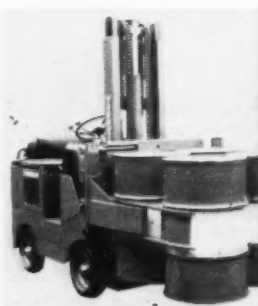


Compact, lightweight construction, made possible by in-line design, contributes to ease of mounting and functional appearance of new valve series. Adjustment of cracking pressure with plus or minus 15% of nominal can be made by using a standard Allen wrench to rotate threaded spring retainer. Series is designated Circle Seal 5100 Relief Valve. For more details, circle key number on rip-out postcard. James-Pond-Clark.

104

Carrier for drums beats handling needs

Designed to be controlled completely from driver's seat, this multiple drum carrier lifts and transports one, two or four drums at one time. Special curved, pivot-mounted arms, with ribbed rubber gripping surfaces, assure a safe hold on either two or four drums. Provides maximum protection to drum surfaces. To secure further information, circle key number on rip-out postcard. Towmotor Corp.



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This unique stretching machine, largest of its kind in the world, exerts a pull of five million pounds as it flattens aluminum plate to relieve the inner stresses in the metal that result from rolling and heat treatment.

Playing a vital role in the operation of the stretcher as it processes aluminum for the airframe, chemical, transportation and shipbuilding industries, is the General Petroleum lubrication engineering program in use at Kaiser's Trentwood, Wash., plant, only aluminum sheet rolling mill on the West Coast.



Kaiser Trentwood plant lube engineer Ewell E. McDole, left, goes over maintenance data with G.P. representative Wayne Williams.

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Speedaire is Cleveland's fan-cooled worm gear speed reducer. Because of the reduction in

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Write for Catalog 400 for full engineering data on Speedaire and all other Cleveland units. The Cleveland Worm and Gear Co., 3290 E. 80th St., Cleveland 4, Ohio.



CLEVELAND WORM GEAR Speed Reducers

Affiliate: The Farval Corporation, Centralized Systems of Lubrication

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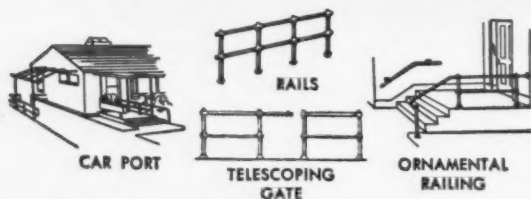
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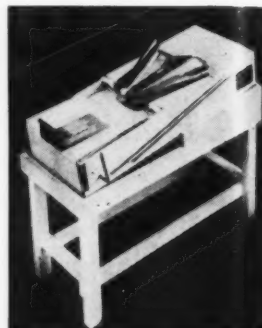
NEW EQUIPMENT

... Begins on page 88

105

Bag packager reduces operating costs

This new machine packages all kinds of products in nearly every type of bag, including hard-to-handle polyethylene. Easy to run, Speedy Bag Packager is small and compact, with 14-in. model occupying floor space of 36 in. x 15 in. Adjustable models cover range of widths from 5 in. to 18 in., lengths from 8 in. to 19 in. Models are available in both AC and DC current. Circle key number on rip-out postcard for brochure. Erich International Corp.



106

New centrifugal wet dust collector

Type "CW-1" answers those dust control problems which cannot be solved by use of cloth type collectors. These problems include: high temperature or moisture; explosive or combustible dusts; corrosive, highly abrasive and/or obnoxious dusts; combinations of foregoing. Cen-



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TEMPERATURE CONTROL



For Steam Heated VATS or TANKS

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Over 60 Years of Automatic Temperature and Humidity Control

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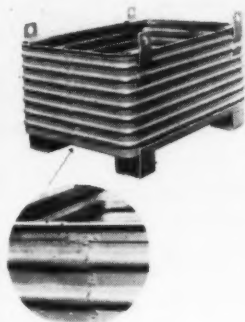
WESTERN INDUSTRY — September, 1954

trifugal collector is of counter-current design and tower type construction. It consists of multiple wet vane sections and a final water entrainment vane section. *To obtain specifications and application information, circle key number on rip-out postcard.* Pangborn Corp.

107

Corrugated steel box boasts lapped joints

Now available are corrugated steel boxes with lapped ends or sides, replacing butt straps and butt weld joints. Lapped joints are said to give greatest possible box strength in handling of heavy duty storage. Boxes have four-way entrances and may be moved by hand, power lift or fork trucks, or tied with a portable elevator. They are built to customer size and capacity specifications. *For complete information, circle key number on rip-out postcard.* The Palmer-Shile Co.



108

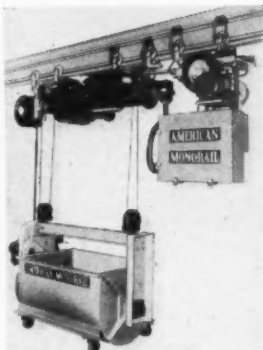
New service for sling customers

Coordination of operations between wire rope sling sales and sling chain sales is a new service offered by American Chain, originators of Registered Sling. Registry specifies and guarantees load capacity by proof-testing to at least double what sling is warranted to lift. Hooks are forged, heat-treated to specified tensile strength, and Magnifluxed to detect hidden defects. *For complete details, circle key number on rip-out postcard.* American Chain & Cable Co., Inc.

109

Automatic carrier with roll-over bucket

Designed for intermittent transfer of bulk materials, this new unit uses standard twin-hook electric hoist for raising and lowering special bucket. Equipped with casters for manual positioning on floor, bucket is mounted within rigid frame with one end geared to electric motor which turns bucket one complete revolution at discharge point. Carrier includes electric controls for automatic dispatch, station selection, and manual operation. *For further details, circle key number on rip-out postcard.* The American MonoRail Co.



110

Blower now cleans clothes fast, safely

A special low pressure blower has been found a workable, safety-tested substitute for previous compressed air

The



Universal Drum Truck

and Battery Powered

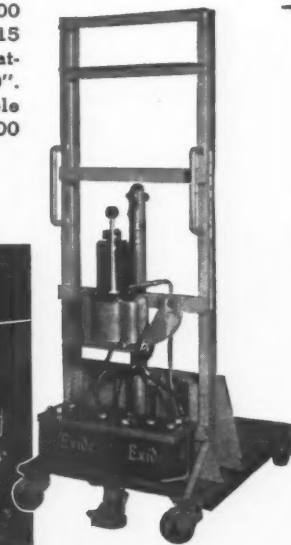
Junior Lifter

This team makes "child's play" of handling drums and barrels



The Universal Drum Truck shown here is the answer to fast, safe handling of drums and barrels. It locks any size container between the adjustable chimb hook and pick-up tips, lifts it easily and carries it with the weight evenly balanced over the wheels.

For stacking drums or barrels, or loading them on trucks or freight cars, you can't beat this Battery Powered Junior Lifter. Lifts up to 500 pounds at the rate of 15 feet per minute. Platform size 30" x 30". Larger lifters available with capacities to 3000 pounds.



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NEW EQUIPMENT

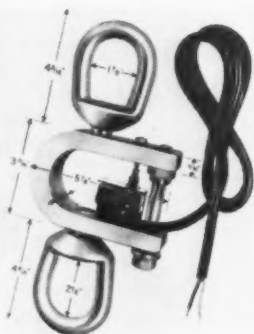
... Begins on page 88

cleaning methods, which were labeled unsafe. Use of low pressure air—of 5 lb. pressure or less—permits cleaning off clothing in 15 to 20 sec. Protective guard at nozzle prevents full force of air blast coming into contact with body of person. *For further details regarding blower, circle key number on rip-out postcard.* U. S. Hoffman Machinery Corp.

111

Safety features added to Dyna-Switch

Two new safety features have been incorporated in the Dyna-Switch, providing increased protection from both excessive overloads and side twist. First of improvements is installation of a free-riding stop bolt, allowing a deflection of only 11,000 lb., while still permitting accidental overloads up to 35,000 lb. with safety and without injury to calibration. Second feature is electric welding of lifting eyes in position. *Circle key number on rip-out postcard for further details.* W. C. Dillon & Co., Inc.



112

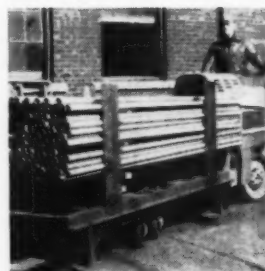
White vinyl coating for paint spray booths

Designed for spraying on wall surfaces of spray booths, White Vincote dries almost at once to a tough, white film. It permits paint, laquer, and enamel overspray to be peeled off quickly and easily, and is claimed to be a poor base for combustion, when dry. Pigment is claimed to remain in perfect mechanical dispersion indefinitely without stirring or agitating. Depending upon thickness desired, one gallon will cover between 250 and 400 sq. ft. of surface. *For additional details, circle key number on rip-out postcard.* Detrex Corp.

113

Extra long, low-lift platform truck

A specially designed low-lift platform truck has been engineered to handle an extra-long rack which serves as a storage unit, load carrier, and work positioner. Truck has a 108 in. long platform, and a capacity of 10,000 lb. It is gasoline-powered. Platform sizes may be obtained according to specific operating requirements. *For additional information, circle key number on rip-out postcard.* The Elwell-Parker Electric Co.



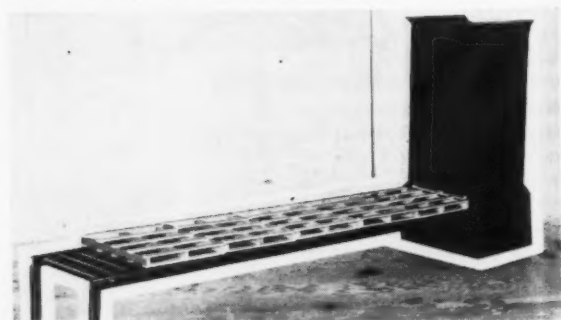
114

Strapping kit for service, maintenance men

Strapping Kit No. 157 is a compact, portable all steel kit developed for service and maintenance men in a wide variety of fields. It consists of A. J. Gerrard #100 Steel-binder tool, #502 Strap Cutter, and an easy-to-carry steel case with removable partitioned tray. Dimensions of case are 12 1/2 x 12 1/2 x 4 in. Its weight, completely equipped, is 19 lb. *For further details, circle key number on rip-out postcard.* A. J. Gerrard & Co.

115

Minimizes pallet stacking damage



Equipment helps solve problems of handling empty pallets at beginning or end of assembly or packaging lines, storage, and loss of time due to injuries. Difficulty of pulling down pallets one at a time or keeping working area clear is eliminated. Equipment is custom built for each

FREE...

BULLETIN 161

2

BULLETINS

on

SHORT RUN

STAMPINGS

BULLETIN 101

FOR... DESIGNERS
METHODS ENGINEERS
PROCESS ENGINEERS
PRODUCT ENGINEERS
MECHANICAL ENGINEERS
RESEARCH ENGINEERS
SUPERINTENDENTS
PURCHASING AGENTS

SEND FOR THESE HELPFUL BULLETINS TODAY

SERVICES BULLETIN NO. 161 describes the facilities that make Federal a one-stop stamping service. Specifications cover special die stamped wrenches, nameplates, and quality short run stampings from any stampable material.

COSTS BULLETIN NO. 101 shows how Federal's special dies give the accuracy, exact duplication, and tolerances of permanent dies plus saving as much as 80% on die costs.

Federal TOOL AND MANUFACTURING CO.
 1407 W. MAGNOLIA BLVD., BURBANK, CALIFORNIA
 AND 3605 ALABAMA AVE., MINNEAPOLIS 16, MINN.

For more details circle No. 70 on Reader Service Postcard

application due to various pallet sizes and receiving and discharge heights. For specifications and further information, circle key number on rip-out postcard. Robco, Inc.

116

Magnetic "Fanner" separates light sheets

To facilitate faster and safer handling of thin gauge metal blanks, tin plate, and can lids, a small fanner, Model SF-01, has been designed. Placed adjacent to a stack of can lids, magnetic unit induces like polarity in lids, causing them to repel each other to such a degree that upper pieces in pile tend to rise in air, separated from one another. Advantages include elimination of double feeding and cuts and scratches to operator's hands. Circle key number on rip-out postcard for further information. Eriez Manufacturing Co.



117

New socketless fitting and hose kit

Of interest to automotive service businesses is a fitting and hose combination that needs no clamps or sockets. Hose is just pushed on fitting, and effect of pressure is to make an even tighter grip. Fittings and hose are available in 1/4-in. and 3/8-in. sizes in kit, and up to 5/8 in. in bulk stocks. For further details, circle key number on rip-out postcard. Aeroquip Corporation.

118

New tierable hopper dump box

A hopper-front dump box designed for compact tiering and roll-over dumping is now available. Corrugated 12-gauge steel containers permit unit-load handling and compact tiering of purchased parts or in-process material. Small quantities can be removed manually from stacked boxes through their hopper front. For more information, circle key number on rip-out postcard. Union Metal Manufacturing Co.



119

Tally machine makes counting easy, fast

Vary-Tally, a machine claimed to reduce counting to 1/3 normal time, is now available. Operation is simple—fingertip pressure on front lever registers each count from one to 9999. Arranged compactly on stands in tiers, it can be supplied in any of 66 combinations, up to 6 banks high and 12 units wide, with a minimum of 2 units wide. For news sheet and prices, circle key number on rip-out postcard. Veeder-Root Inc.

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If this Housing ever Breaks or Distorts we will replace it Free



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Deep narrow jaws for close work—break-proof housing—famous RIGID jaw suspension—comfort-grip I-beam handle. Ask your Supply House.

THE RIDGE TOOL COMPANY, ELYRIA, OHIO, U.S.A.




For more details circle No. 71 on Reader Service Postcard

For safe, clean, economical handling of liquid materials

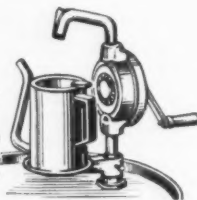
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liquid materials handling

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 See Yellow pages for your local sales representative
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Brass	Tempered)
Bronze	Stellite
Titanium	

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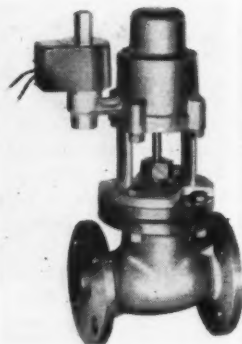
NEW EQUIPMENT

... Begins on page 88

120

Solenoid valves offer corrosion resistance

A new line of cylinder operated solenoid pilot controlled valves for handling corrosive gases and liquids is now available. Almost any corrosive gas or liquid can be handled since body material can be selected for particular fluid. Flexibility in construction permits free choice of body materials to suit fluid controlled. Valves can be mounted in any position. For detailed literature, circle key number on rip-out postcard. Automatic Switch Co.



121

Lighting system rated for 25,000 hr.

Industrial Cold Cathode lighting is now fully rated for 25,000 hr. throughout complete system of lamps, fixtures, and ballasts. By incorporating a newly patented circuit, lamp efficiencies have been materially increased by lowering wattage losses through ballast. For new brochure that explains Cold Cathode Industrial Lighting in a non-technical manner, circle key number on rip-out postcard. CeLine, Inc. A.I.A. No. 31-F-21.

122

Larger box meets materials handling needs

Model No. 360 has been developed to supply demand for a materials handling box midway between a tote box and a heavy corrugated bin-type container. Unit is 36-in. long, 14-in. high, and 16½-in. wide. These all-welded 14-gage steel boxes tier in rigid stacks when filled. Contents remain fully visible and accessible. Model can be used in conjunction with powered belt, overhead, wheel, and roller conveyors. For complete details, circle key number on rip-out postcard. Chas Wm. Doepke Mfg. Co., Inc.



123

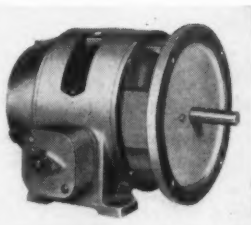
Triple-stack retaining ring dispenser

A new dispenser which automatically feeds three Walde Truarc crescent or E-shaped retaining rings at one time has been developed. Rings are withdrawn with a special applicator tool having three fork heads set in a standard applicator handle. Both dispenser and applicator are engineered for individual applications. Unit is claimed to save time and motion, speeding assembly with rings and lessening operator fatigue. For more details, circle key number on rip-out postcard. Walde Kohinoor, Inc.

124

New stall type torque motor

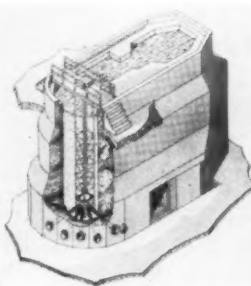
This motor can be stalled or "locked," with current on, without damage to motor. Unit automatically adjusts its speed to intermittent load changes, at same time maintaining a constant power. Typical applications include winding film or wire onto spools; closing and holding closed electrical contactors, valves, and locking devices; opening and holding brakes. *For selection chart and other engineering data, circle key number on rip-out postcard.* Reuland Electric Co.



125

Atomic research reactor available

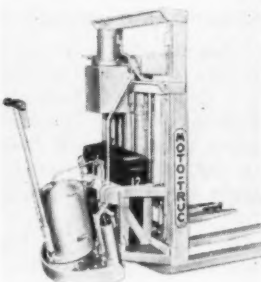
An atomic research reactor, adapted for use in training personnel for nuclear power industry, as well as for conducting basic nuclear research and development, has been placed on the market. Design is a modified version of declassified "swimming pool" reactor. Suggested uses include neutron experiments, radiation chemistry, biological research, radioisotope production, materials development, and engineering education. *For more information, circle key number on rip-out postcard.* Babcock & Wilcox.



126

"Jack Knife" eliminates outrigger "hang up"

New "Jack Knife" action truck increases operational range of standard outrigger type Hi-Lift trucks. "Hang up" is eliminated by repositioning of truck frame, accomplished by means of a hydraulic pump and ram unit. Feature may also be put onto trucks presently in operation. *Circle key number on rip-out postcard for specifications and literature.* The Moto-Truc Co.



127

New high-strength aluminum alloy

K186 is a high-strength, non-heat-treatable aluminum alloy especially designed for weldability and adaptability to structural applications. This new alloy is available in sheet and plate form, in a full range of tempers. Suggested

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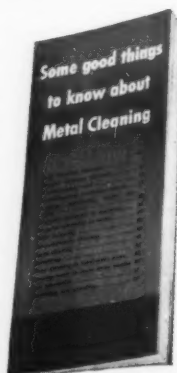
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The Clipper No. 9 Portable Lacer laces belts up to 6 inches wide in one quick, easy operation. Under powerful pressure hook legs are embedded flush with the surface of the belt and points clinched, making a perfect joint.

Phone your Industrial Distributor for a demonstration!

CLIPPER BELT LACER COMPANY, GRAND RAPIDS 2, MICHIGAN, U.S.A.



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NEW EQUIPMENT

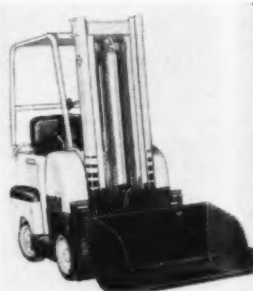
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applications include infired pressure vessels, structural towers, welded boat hulls, trusses and girders, tanks, pipelines, and scaffolding. *For more complete details, circle key number on rip-out postcard.* Kaiser Aluminum & Chemical Corp.

128

Here's scoop on new scoop type shovels

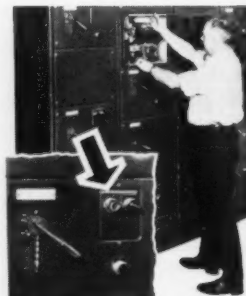
Two scoop-type shovels (hydraulic and mechanical) for fork lift trucks have been developed. New attachments are designed to handle loose or bulk materials, such as: coal, cement, and core sand. They are interchangeable with standard forks and easy to mount. *Circle key number on rip-out postcard for more information.* The Buda Co., Division of Allis-Chalmers Manufacturing Co.



129

New control center offers flexibility

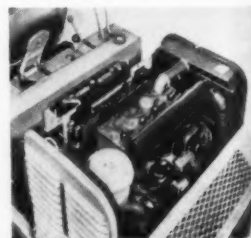
A newly designed control center featuring extensive flexibility has been made available. Removable operator's panel in door of each individual combination plug-in unit accommodates up to four push buttons, selector switches, or pilot lights. Standard control center section dimensions are 20 in. wide, 20 in. deep, and 90 in. high. *Circle key number on rip-out postcard for further details.* Square D Co.



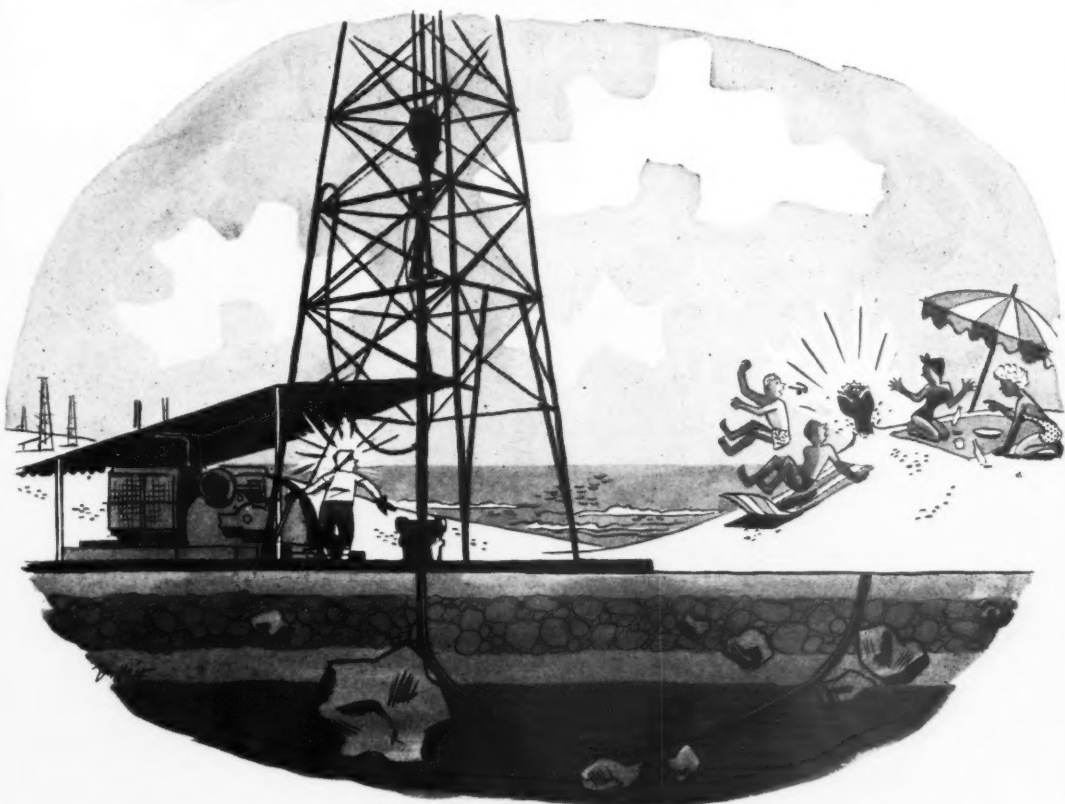
130

Gas-electric power unit quickly installed

An interchangeable gas-electric power unit for electric industrial trucks has been specially designed for quick installation on 2000 to 5000 lb. sit-down-type electric trucks without need for seat alteration. Model HA-3 instrument panel is located within easy reach and view of operator, and fully protected against damage. Newly developed hinged cover permits quick, easy access to engine accessories. *Circle key number on rip-out postcard for more information.* Ready-Power Co.



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No matter which direction a steel problem comes from, a call to Jorgensen will set you straight. Jorgensen's complete stocks of carbon, alloy, stainless, tool and specialty steels give you the right steel for the job — every time! And Jorgensen also carries complete stocks of aluminum. Next time, be rigged for any kind of steel problem — **CALL JORGENSEN FIRST!**



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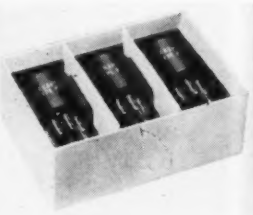
NEW EQUIPMENT

. . . Begins on page 88

131

Pulse transformer sample package

A sample package containing one each of three types of pulse transformers, PT-1, PT-2, and PT-3 is being offered. Transformers are all of octal tube base plug-in construction with cores of quality magnetic material, wound, uncut. They may be used for blocking oscillators, coupling, and impedance matching. Three types of transformers contained in package, Sp-1, differ chiefly in amount and kind of material used in core. For more information regarding sample package, circle key number on rip-out postcard. Berkshire Laboratories.



132

New two-in-one capacitors

Newly designed capacitors for air conditioners can individually provide power factor correction of two single capacitors of same voltage ratings. Two-in-one units are generally less costly, occupy less space, weigh less, and require less handling than two single capacitors, according to company's engineers. Capacitors are available in voltage ratings of up to 440 volts AC with selective microfarad ratings. Circle key number on rip-out postcard for further details. General Electric Co.



133

New curved portable conveyor support

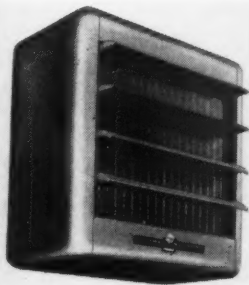
New Curve SpeedTrux now comes in a model designed to accommodate curved pieces of both Speedways gravity wheel and gravity roller conveyors, plus maximum load of either. Of all-welded construction, it has adjustable vertical arms of 1 1/4-in. pipe that can be raised to any height desired, or lowered to a minimum of 16 in. For additional details, circle key number on rip-out postcard. Speedways Conveyors, Inc.



134

Unit heater for high steam pressures

Designed to provide comfortable outlet temperatures on high pressure, high temperature steam systems is a new series of horizontal unit heaters. New propeller fan unit heaters can be used on steam systems of pressures up to 125 psig. Capacities range from 385 to 5430 cfm (70 deg. air), 17,400 to 228,000 Btu/hr (with 60 deg. entering air and 2 psi. steam pressure). *Circle key number on rip-out postcard for your catalog giving full capacity and specification data.* American Air Filter Co., Inc. 700-A5.



135

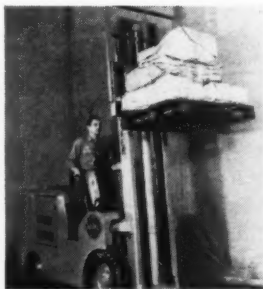
Here's "hot job" protective apparel

A new line of protective clothing, either aluminized asbestos or aluminized duck, is available. Asbestos fabric is in a new herringbone weave, which is 50% lighter in weight than standard basket weave cloth. Aluminized fabric, which reflects 90% of radiant heat, permits workers to operate in greater heat, for longer periods. Clothing is lighter, which allows greater efficiency. *For more information, circle key number on rip-out postcard.* American Optical Co.

136

New gas powered fork lift trucks

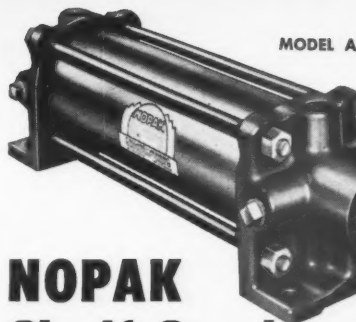
Designed to speed handling of materials in manufacturing plants, warehouses, and rugged outdoor terrain, two industrial fork lift trucks have been added to line. FD 50 is rated for loads up to 5000 lb. and FD 60 for loads up to 6000 lb. Claim is made trucks can do a day's work on less than 5 gal. of gas. Design features include worm-gear driven power axle and inching control. *Circle key number on rip-out postcard for complete details.* The Baker-Raulang Co.



137

High-density Fiberglas put to many uses

Called molded or high-density Fiberglas, a new product is made by molding uncured, fluffy Fiberglas insulating "wool" under heat and pressure to form an object of desired shape and density. They say that resulting material will not rot, burn, absorb moisture, shrink, or stretch. Examples of its diverse uses include gaskets, motor mounts, automotive instrument panel pad, air conditioning baffle, shipping cartons, filters, and pre-formed insulation. *Circle key number on rip-out postcard for additional details.* Owens-Corning Fiberglas Corp.



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**Now in
its 6th
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NOPAK Shelf-Stock Service...

**based on these 2
Standard Mounting,
Class 1, Cushioned
Cylinders**



MODEL E

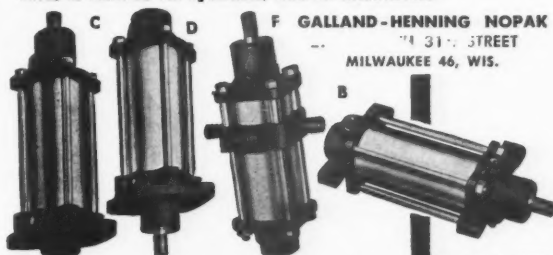
LIST PRICES F.O.B. Milwaukee, Wisconsin

Cyl. Dia. Bore	STOCK STROKE LENGTHS — Double Acting Cylinders								
	1"	2"	3"	4"	6"	8"	10"	12"	15"
1½"	24.16	25.72	26.08	26.44	27.16	27.88	28.60	29.32	30.40
2"	26.24	27.88	28.32	28.76	29.64	30.52	31.40	32.28	33.60
2½"	32.36	34.12	34.68	35.24	36.36	37.48	38.60	39.72	41.40
3"	35.04	37.28	37.92	38.56	39.84	41.12	42.40	43.68	45.60
4"	40.84	43.68	44.52	45.36	47.04	48.72	50.40	52.08	54.60
4½"	48.96	51.92	52.88	53.84	55.76	57.68	59.60	61.52	64.40
6"	66.60	70.80	72.20	73.60	76.40	79.20	82.00	84.80	89.00
8"	126.80	129.20	131.60	136.40	141.20	146.00	150.80	158.00	

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NOPAK 4-Way Valves, hand, foot, solenoid, or pilot operated, to activate all cylinders, also in Shelf-stock.



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DESIGNED for AIR and HYDRAULIC SERVICE

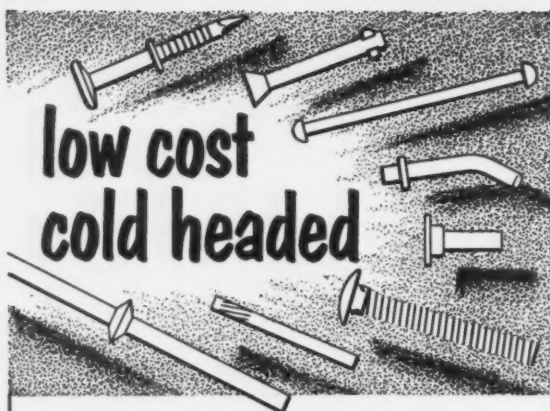
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E. C. Griffin Company, 524½ First Ave. South, Seattle 4, Wash.
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For more details circle No. 80 on Reader Service Postcard



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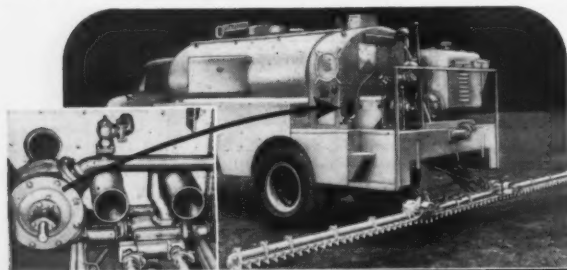
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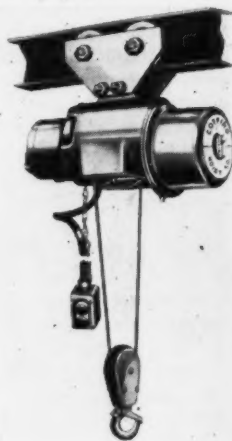
NEW EQUIPMENT

... Begins on page 88

138

Cable electric hoist for heavy production

Cable Quik-Lift Electric Hoists are an answer to need for a fast, flexible unit on many industrial applications. Ranging in capacity from 500 to 4,000 lb., with a choice of lifting speeds and types of suspension, units are designed for heavy production-line work. Hoists provide push-button control; large, separate load and motor brakes; foolproof limit switch and many other safety features. Circle key number on rip-out postcard for prices and specifications. Colling Hoist Co. CQ



139

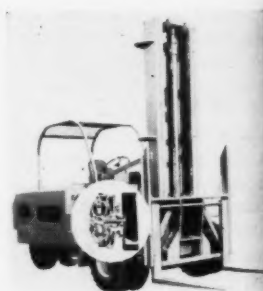
High speed reproduction machine

A tabletop direct reproduction machine, designed for use in engineering, drafting, and architectural fields, is now available. New unit, Copyflex Series 100 model, has an operating speed of 12 ft. per min., and has a printing width of 11 in. Series 100 is a self-contained copying unit based on diazo direct copying process. For additional details, circle key number on rip-out postcard. Charles Bruning Co., Inc.

140

Lift trucks feature torque converters

All Gerlinger long wheel-base fork lift trucks are now available with hydraulic torque converter drive. Capacities of trucks are 12,000, 15,000, 16,000, 18,000, 20,000, and 22,000 lb. Advantages of torque converter drive include: clutch wear reduced to minimum; entire drive system protected by uniform power flow; maximum power and torque for starting without clutch slipping; no stalling on grades. Circle key number on rip-out postcard for more information. Gerlinger Carrier Co.



141

Meehanite method improves iron castings

Ductliron castings are now being regularly produced, using results of Meehanite's improved and simplified manufacturing process. Superior strength properties combined with ductility, smooth machinability, and controlled hardness values are said to be achieved with new Meehanite method. Circle key number on rip-out postcard for further information. Vulcan Foundry Co.

... MORE NEW EQUIPMENT ON PAGE 106

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HELPFUL LITERATURE



144
On aluminum utility sheet
Here's new lit describing applications, specifications, and availability of Kaiser Aluminum utility sheet. Special emphasis is placed on use of sheet for duct work. Tables show weight per standard flattened sheet, weight per lineal ft. of coil; and weight and coverage of equivalent galvanized gauges. *Kaiser Aluminum & Chemical Corp.*

145
Explains easy-to-assemble scaffolding
This 12-page bulletin describes and illustrates Brainard's unusual scaffolding system, which requires only one basic part. Booklet shows principle of assembly, a patented slip-fit arrangement which eliminates nuts, bolts, pins, or tools. It also illustrates various applications and shows all parts of system in scale. *Brainard Steel Division of Sharon Steel Corp.* 8-001

146
"Concrete Floors Now . . . and for the Future"
. . . is a 28-page illustrated booklet giving details on heavy-duty concrete floors. Described is absorption process method of installation in a step-by-step pictorial sequence. Methods of materials selection and a partial list of users are also given. *Kalman Floor Co., Inc.*

147
Shows hydraulic equipment
A four-page catalog includes detailed text as well as large illustrative photographs and charts on new hydraulic equipment. Brochure describes multi-range flow control valve, direct operating pressure controls, and pilot-operated check valves. *The Denison Engineering Co.* 143-A

148
Protective apparel folder shows actual swatches
Sureseal, clear Vinyl, and white Vinyl swatches in several weights are included in this new folder on Surety aprons and other protective apparel. For easy identification, specifications are given under each swatch, along with explanation of type of service for which each material is best suited. *The Surety Rubber Co.*

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149

Bearing buying guide

This comprehensive price and size catalog covers common flat box bearings, solid and split shaft collars, and porous bronze bearings. Dimensions, weights, and materials are included in easy-to-read charts. *R. & J. Dick Co.*

150

Helpful packaging specifications

If you're interested in obtaining more information on packaging specifications, here's a good aid. This four-page bulletin lists sources for obtaining packaging requirements for specific needs. Also shown is a detailed drawing demonstrating solution to typical packaging problem. *Container Laboratories, Inc.*

151

All about registered sling chains

This 32-page, illustrated catalog provides information on ACCO registered sling chains. Brochure covers advantages and limitations on all types of chains, and offers specification charts and other technical data. *American Chain & Cable Co., Inc. DH-314*

152

Steel specialty products pictured

An illustrated folder showing types of forged, upset, punched, headed, and threaded bolt and nut specialties is available. Several photographs and specification charts are included. *Bethlehem Pacific Coast Steel Corp. 586*

153

Folder displays dragline trucks

A new circular is available describing Floormaster dragline trucks for both in-floor and overhead conveyor lines. Details of construction, engineering highlights, and installation photographs are included, with complete specifications on various models available. *Lewis-Shepard Products, Inc. 29-A*

154

Spherical bearings subject of brochure

This 20-page booklet provides complete technical information on Unibal spherical bearings and spherical bearing rod ends. Tables and diagrams are employed to describe bearing specifications. *The Heim Co. 15*

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HELPFUL LITERATURE

FOR THE PLANT OPERATOR WHO WANTS TO KEEP INFORMED

155

Fluorescent guide

A fluorescent products guide book, written in non-technical language, is available for use of both buyers and sellers of fluorescent products. This 22-page brochure contains information on what fluorescent lighting is, its advantages, sizes in which lamps are available, colors, and necessary accessories. *Sylvania Electric Products Inc. FL-524*

156

About metal building panels

This 44-page catalog offers extensive information on Fenestra steel and aluminum building panels. Diagrams showing panel details, photographs, and a thorough text cover uses and engineering specifications. Brochure includes charts and tables providing complete technical data. *Detroit Steel Products Co. BP-1*

157

Bulletins describe "Banty" tractors

Two new bulletins offer details on Mercury's four-wheel "Banty" 460 gas tractors, available in both standard and heavy-duty models. Performance features, detailed specifications, and dimensions are shown for each model. *The Mercury Manufacturing Co. T-101 and T-102*

158

Industrial uses for Celite products

"Celite Flattening Agents and Pigment Extenders" is a 16-page illustrated booklet which covers general advantages of Celite diatomite products. Publication gives information on use of Celite in nine basic types of finishes, with one or more typical formulations for each. Celite as a filter aid for clarifi-

cation filtration in producing varnishes is described. *Johns-Manville. FA-47A*

159

Info on all-steel Motoreducers



A 28-page catalog is available giving information on how to select horizontal, vertical, or right-angle Falk Motoreducers. Bulletin includes tables, dimensions, weights, overhung load ratings, and thrust capacity ratings. A foldout section bound into middle of book contains illustrated data on mounting positions, low speed shaft connections, and product features. *The Falk Corp. 3100*

160

On Powder River Basin

A study of resources, people, and economy of Powder River Basin is provided in this comprehensive brochure. Numerous tables and graphs contribute in making publication a thorough exploration of region. Included are sections presenting economic activity and development possibilities. *College of Commerce and Industry, University of Wyoming.*

Circle key number on rip-out card for literature you want.

161

Industrial tire information

Here's a folder describing features of Mitco industrial tires. Bulletin claims tires eliminate work stoppage caused by punctures or blowouts and are equal to heaviest ply pneumatic tires. A list of sizes and description of mounting are included. *Mitchell Industrial Tire Co., Inc.*

162

Steel strapping idea guide

This spring-summer issue of "Signode Seal" answers many requests for authoritative information on how to strap pallet loads. Guide features illustrations of six basic ways of unitizing. Also described are strap form ties for securing concrete column forms in construction industry. *Signode Steel Strapping Co.*

163

"Proper Care of Floors"

This brochure offers a fund of instructive material for cleaning, sealing, and maintaining all types of floors. Booklet describes specialized uses of West floor products. Included is section of helpful hints and a handy floor preservation guide in easy-to-read chart form. *West Disinfecting Co. 25-BB*

164

"Where to Use Tapecoat"

... describes wide range of uses for Tapecoat as a protection against corrosion. Available in either coal tar or asphalt, Tapecoat comes in easy-to-apply tape form. Services discussed which employ Tapecoat include gas and oil lines, transportation and communications, water and sewage, and industrial operations. *The Tapecoat Co.*

IRA G. PERIN CO.

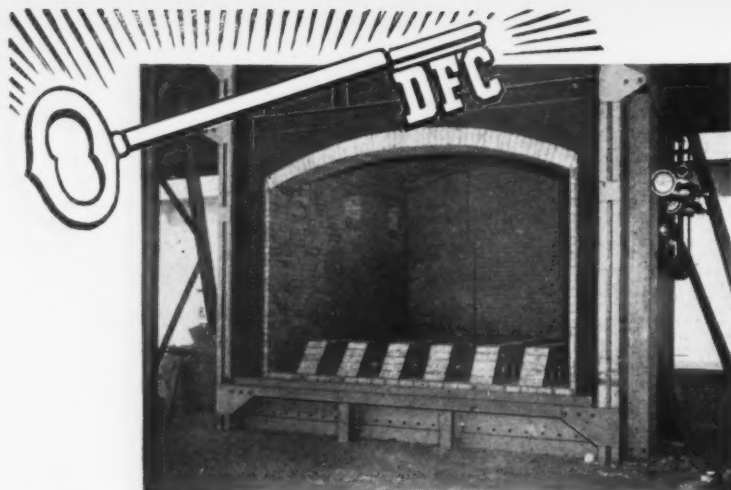
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HELPFUL LITERATURE

165

Controlled-air-power devices

This 36-page, illustrated catalog gives a detailed description of Bellows air motors and their wide application in industrial operations. Publication contains specifications, technical information, and numerous photographs of various models. *The Bellows Co. CL-50*

166

Case history on purchase orders

How Dravo Corporation achieved office time savings of 80% through improved follow-up control of purchase orders is subject of this new case history. Study demonstrates how this was made possible through use of a Remington Rand visible control system. *Remington Rand Inc.*

167

Describes rubber products for industry

This new catalog covers V-belts, transmission belts, conveyor belts, all types of hose, and molded products. Illustrated with product and installation photographs, its condensed copy is organized for quick reference. *Raybestos-Manhattan, Inc. 25-C*

168

New Aircro booklet

A 12-page technical reprint, "Carbon-Steel Electrodes for Use with Inert Gas Shields," is available. Booklet is a study of properties of electrode weld deposits, for production use in welding of carbon steel by inert-gas-shielded metal-arc process. Pictures and charts are included. *Air Reduction Pacific Co. ADR89*

169

Truarc engineering data

This 52-page, illustrated manual contains complete technical information on Waldes Truarc retaining rings. Catalog provides specification data charts, and lists in full special ring types, field applications, and pliers and accessory tools. *Waldes Kohinoor, Inc. rr 9-52*

170

Shows ball bearing units

A catalog containing 64 pages of detailed information on SealMaster ball bearing units is being offered. Publication, which includes several

photographs of units, gives complete technical data and specifications. *Stephens - Adamson Manufacturing Co.* 454

171

About cutting steel

Said to be fastest cutting steel ever made, Ledloy (lead bearing steel) is described in this new bulletin. Literature gives chemical composition, mechanical properties, and case studies. *Joseph T. Ryerson & Son, Inc.* 11-1.

172

"Preventive Maintenance for Industrial Trucks"

... details requirements of a proper preventive maintenance program for industrial vehicles. Booklet explains importance of good lubricants and correct lubrication and enumerates principal causes of equipment failures and breakdown. It also contains several maintenance forms used by Elwell-Parker which may be copied for a company's own use. *The Elwell-Parker Electric Co.*

173

Info on constant voltage welding applications

Factual data describing principle of constant voltage power supply and its application to inert gas, submerged arc, and other automatic welding processes is given in a series of data sheets. Included is a report, "Constant Voltage Control for Automatic Metal Arc Welding." *Glenn Co.*

174

Highlights on Vacu-matic filter

This catalog sheet supplies features of Hoffman Vacu-matic filter available in two models: 20 and 40 gpm. Filter is a completely automatic and self-cleaning unit designed for continuous filtration of grinder, hone, and other machine tool coolants. Sheet gives specifications and dimensions. *U. S. Hoffman Machinery Corp.* A-915

175

"How Independent Laboratories Serve You"

This brochure is a guide to services provided by A.C.I.L., a professional association of independent scientific laboratories. Laboratory services cover research, testing, and inspection in a wide variety of fields ranging from chemicals to textiles. A list of member laboratories is included. *American Council of Independent Laboratories, Inc.*

Circle key number on rip-out card for literature you want.

176

How to stop rust and corrosion

Instructions on application of Rust-Oleum primer and finish are contained in this folder. Bulletin states Rust-Oleum, with proper surface preparation, will penetrate rust to bare metal,

incorporating rust particles into coating. It is also claimed to resist salt water, salt air, salt spray, heat, fumes, humidity, and sun. *Rust-Oleum Corp.* 150

177

New sheet fanner magnets attract interest

A folder telling how Eriez new permanent sheet fanner magnets increase production and save manhours is available. By separating difficult, hard-to-handle metal sheets, magnets elim-

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HELPFUL LITERATURE

inate "doubles" which cause smashed dies and down-time. Bulletin gives typical separations obtained on various sizes and weights of sheets, and shows selector chart and specifications. *Eriez Manufacturing Co.* 3547

178

How to lick the dust!

Industrial installations of Flexaust hose and Portovent duct, for moving air, dust, fumes, gases, and materials, are pictured in this folder. Bulletin illustrates such applications as saw-dust removal, spot cooling or heating, abrasive dust collection, and chemical fume exhausting. *The Flexaust Co.* 43

179

Split roller bearings

This catalog fully describes and illustrates Cooper split roller bearings. Literature includes information on selection of proper bearings and detailed drawings, as well as charts giving complete technical data and specifications. *The Cooper Split Roller Bearings Corp.*

180

For facts on new Life-Line "A" motor

This handsome 24-page brochure describes improved features of new Westinghouse Life-Line "A" motor. Photographs, diagrams, and text offer detailed explanation of Life-Line's advancement in design and performance. *Westinghouse Electric Corp.* 75M-3-54

181

Refers to arc and resistance welders

A catalog containing technical details on Birdsell arc and resistance welders is available. Publication includes specification charts on all models, both heavy-duty and those used in general welding and maintenance service. *Birdsell Manufacturing Co., Inc.*

182

Discusses blast cleaning abrasive

This new 8-page booklet describes Wheelabrator Steel Shot, a cast steel, heat treated, blast cleaning, and peening abrasive. Included is a tabular

comparison of characteristics of various types of metallic abrasives. Performance data is presented from various industries in which abrasive is used. *American Wheelabrator & Equipment Corp.* 89-A

183

Info on NesTier hopper rack

Here's a two-color bulletin which illustrates, describes, and gives complete specifications on new NesTier hopper rack. Publication explains how new components convert standard NesTier materials handling boxes into small parts hoppers. These place a continuous supply of small parts within reach of an assembler or production worker. *The Chas. Wm. Doepke Mfg. Co., Inc.* HR-101

184

Anti-slip protection described

This single-pager tells about Gumrok, an abrasive, plastic-like paste, claimed to give effective anti-slip protection on metal, concrete, wood, or other floors. Bulletin states Gumrok is inexpensive and easy to apply, and dries to a tough surface that bites through spillage of oil, grease, or water. *Walter G. Legge Co., Inc.*

MORE NEW EQUIPMENT

... Begins on page 88

142

Loading-dock bumpers added to line

Durable Rubber-Dock Bumpers are made of many pieces of resilient rubber and cord mounted edge-wise to absorb shocks of trucks backing into steel plates or heavy timbers of average loading dock. Said to last for years, they will not compress and require no covering. *Circle key number on rip-out postcard for further information.* Robco, Inc.

143

Towing tractor added to electric line

A completely new electric towing tractor, known as "Electric Clarkat," has a normal rated drawbar pull of 600 lb. It is available in two models: Clarkat-24, with 2400-lb. breakaway drawbar pull and Clarkat-30, with 3000-lb. breakaway drawbar pull. Ease of operation, a simple, effective automatic magnetic-controlled electrical system, and modern styling are among features claimed for tractor. *For more details, circle key number on rip-out postcard.* Clark Equipment Co.



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and special grades

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WESTERN INDUSTRY — September, 1954

Illustrates miniature ball bearings

A new 12-page catalog is available offering technical data and specifications on RMB miniature ball bearings. Booklet covers pivot, angular contact, radial, Filoseal, roller, and special types. Included are photographs, diagrams, and charts on each. *Landis & Gyr, Inc.*

Explains pellet-type calcium chloride

A 60-page brochure which gives a complete report on newly developed, high-test, pellet-type calcium chloride is available. It explains why and how Peladow permits for first time transportation, storage, and mechanical handling of calcium chloride in bulk. Complete data on properties, specifications, and applications are included. *The Dow Chemical Co.*

Circle key number on rip-out card for literature you want.

Story behind Oakite products

This brochure provides a detailed picture of Oakite's chemical, engineering, and technical research force at work. Action photographs and text take you on a behind scenes tour of Oakite's large research operations. A detailed cut-away drawing shows Oakite's laboratories in New York City. *Oakite Products, Inc.* F8739

New two-pole motor described

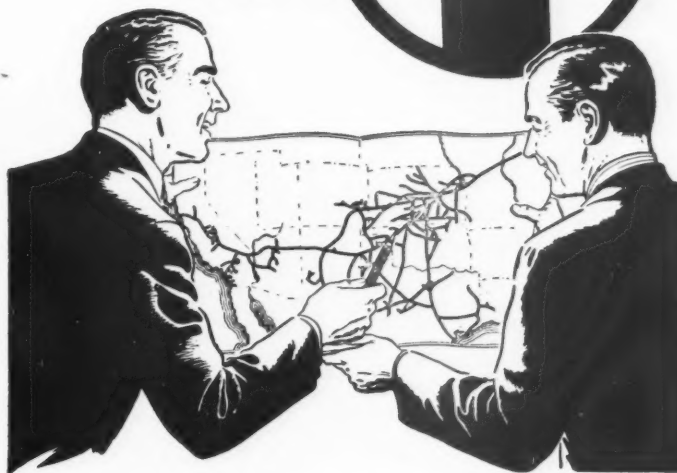
Design of Allis-Chalmers two-pole motors 900 hp. and larger is described in this 8-page bulletin. Diagrams include a sectioned view of a typical large Allis-Chalmers two-pole squirrel-cage induction motor, and others showing how machine is spirally ventilated. *Allis-Chalmers Manufacturing Co.* 05R8123

Summarizes steam heating line

Five major types of steam heating systems, and a full line of valves, traps, and steam power specialties are described in a new condensed catalog. Featured is Illinois' "Selectotherm" system, automatically controlled high

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HELPFUL LITERATURE

vacuum steam heating system that adjusts its heat output and fuel consumption to outdoor temperature and heat loss conditions. *Illinois Engineering Co., Division of American Air Filter Co., Inc.* 110

190

Stationary batteries outlined

Here are two new bulletins covering C & D's complete line of lead-calcium and lead-antimony batteries for control, switchgear, and auxiliary power applications. Specifications include data on battery ratings and capacities, dimensions, weights, and types of containers. *C & D Batteries, Inc.* CP-536 and CP-537

191

RM transformer manual

This 40-page illustrated catalog gives full details on GE Repetitive Manufacture power transformers. These include RM-ASA ratings of 501 through 5000 kva. single-phase, 69 kv. and below, and 501 through 10,000

kva. three-phase. Booklet gives weights, dimensions, prices, and specifications on all items. *General Electric Co.* GEA-6108

192

Handy lube chart

This lubrication wall chart gives complete, easy-to-understand data for Hyster's new RC-150, 15,000-lb. capacity lift trucks. Chart is patterned after similar Hyster charts available for Hyster Straddle trucks, Karry Kranes, Turret trucks, and lift trucks. *Hyster Co.*

Circle key number on rip-out
card for literature you want.

193

Insul-Mastic protective coatings

... and their wide variety of uses are described in this 8-page illustrated brochure. Major functions and properties are covered in text. A selection table giving applications, types, special features, and other technical notes is included. *Insul-Mastic Corp. of America.*

194

Heater case study reports

This brochure of engineering case studies describes nine ways in which warm air space heaters were used to heat a variety of diversified manufacturing plants. Each bulletin describes an individual plant's requirements and lists benefits derived by installing heaters. Industries featured include paint and glass work, plywood manufacturing, radio assembly, and mining tool construction. *Dravo Corp.*

195

Meehanite castings pictured in detail

"Meehanite Castings for Pressure Tightness" is a 64-page manual which makes extensive use of photographs and text to demonstrate Meehanite properties. Catalog shows charts giving load strain and examples of various uses of Meehanite castings. *Meehanite Metal Corp.* 43

196

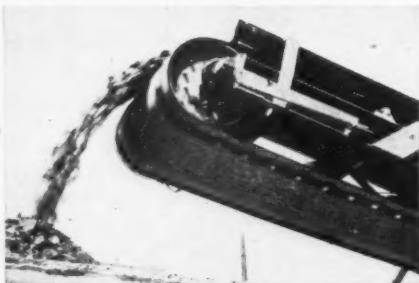
Aircraft ball bearings brochure

A catalog containing technical data on M-R-C aircraft ball bearings is

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stalled — requires no more room than idler pulley. All moving parts protected against weather, grit, dirt. Diameters 10 1/2" to 56". 1/3 to 125 hp. for voltages to 2300. Job proved.

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offered. Tables include information on dimensions, mounting fits, weights, and other specifications. *Marlin-Rockwell Corp.* 1527-3

197

Covers vibrating equipment

A 230-page catalog provides extensive details on complete line of Jeffrey Manufacturing vibrating equipment. Types of equipment include feeders, conveyors, coolers, dryers, mixers, packers, screens, controls, and magnetic separators. Both electrical and mechanical vibration as applied to line is fully treated as to principles of operation and application. *The Jeffrey Manufacturing Co.* 870

198

Story on Taper-Lock bushings

Of primary interest to designers of industrial equipment, this 8-page booklet describes Taper-Lock bushings, hubs, and adapters. Cover illustrates Taper-Lock bushing used in a variety of products. Information throughout bulletin is mostly in tabular form. Included are cross section drawings, bushing numbers, bore sizes, dimensions, weights, keyseats, and list prices. *Dodge Manufacturing Corp.* A-628A

199

Instrumentation bulletin offered

A new system of instrumentation for measurement and/or control of liquids is described in an 8-page booklet, "Pneumatic Operated Control." Bulletin illustrates five basic principles used and applications in water and waste treatment plants. *General Filter Co.* 5421

200

New data on chain drive capacity ratings

A revised 16-page illustrated catalog includes expanded data on capacity ratings of Morse Hy-Vo high-speed heavy-duty chain drives. Information includes specifications and capacity curves and installation and lubrication recommendations. *Morse Chain Co.* C72-51

201

Helpful packing data

Six new technical bulletins, each featuring essential data on individual types of packings, are available. Compiled to save time for designers, engineers, and maintenance departments, each booklet contains information and standard sizes for only one specific style of rubber or leather packing. *E. F. Houghton & Co.*

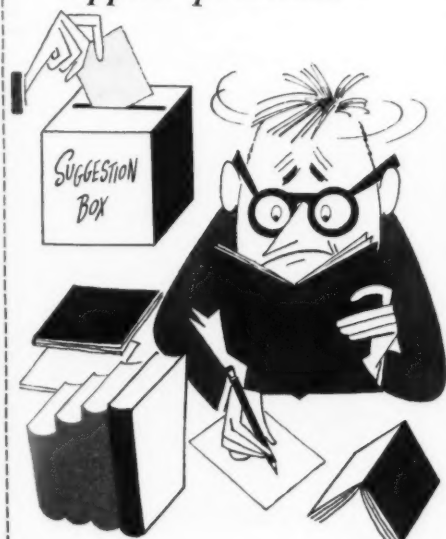
PLASTER CASTING process perfected

WITH THE PERFECTION of a plaster casting process by Aluminum Company of America, an important new production method for casting aluminum is reducing process time and cost, thereby opening many new fields of application.

New facilities have been completed at the Vernon, Calif., plant which, it is hoped, will extend the design possibilities for aluminum and magnesium castings and allow foundry production of parts that were formerly impossible to produce.

Permeable plaster molds allow the casting of aluminum parts with thin cross sections and with excellent surface smoothness. In addition, accurate dimensional tolerances can be met with the process. Physical properties of castings from permeable plaster are equal, in most cases, to those provided by aluminum sand castings. Plaster molds components, already in extensive use for torque converter parts, offer other promising applications in the volume production of small castings, such as small bearings and building hardware parts.

*Suggestion on
supplier problems?...*



The answer's in the YELLOW PAGES!



That's a very good suggestion. Suppliers of local and nationally advertised products and services are easy to find in the Yellow Pages. In addition to listing their name, address and telephone number many suppliers give other helpful information such as brand names, delivery areas, and business hours. That's why purchasing agents (and most everyone else, too) use the "Classified" telephone directory to find local suppliers of goods or services.

You'll find it fast in the YELLOW PAGES!



Pacific Telephone

For more details circle No. 97 on Reader Service Postcard

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YOUR MATERIAL HANDLING

with these modern
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Handles bags, bundles, packages up to 135 lbs.—reversible apron—conveys up or down. Available in 14 and 24 inch belt widths. Write for Bulletin 63 D. Address WI-94.



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• Available in a complete line of sizes and capacities designed to allow the selection of the best roller conveyor for the job—from a 1 inch diameter roller, capacity 35 lbs. Any commodity with one smooth riding surface can be carried—boxes, cases, cartons, lumber, milk cans, brick, tile, units and parts. Straight sections and 90° and 45° curves. Write for Bulletin 63 D; address WI-94.

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Send for Bulletin 63-D, describing
Standard gravity and power con-
veyors and conveyor units — ad-
dress Dept. WI-94



For more details circle No. 90

PLANE PAINTING speeded up

PRODUCTION ENGINEERS at Lockheed Aircraft Corp., Burbank, Calif., have developed a mobile mid-air paint booth which cuts painting time per airplane by five days.

Containing spray gun equipment and called a "howdah," the booth fits like a circus tent over the top of a Super Constellation and carries a crew of painters back and forth along the plane's 113 ft. length. The booth allows exterior airplane painting to progress simultaneously with other final assembly operations.

Suspended from an overhead crane, the fuselage-straddling booth measures 20 ft. high, 13 ft. wide, and 13 ft. long. Painters stand on protected side stands or scaffolds beneath the howdah's hood. This new device saves time formerly required to: (1) Take a plane off the final assembly line and move it to a separate paint building; (2) Schedule it into a two-station paint line; and (3) Return it to final assembly operations.

The booth is outfitted with a specially designed exhaust system which eliminates any potential fire hazard by automatically sucking up all paint residue and fumes through a filtered vent in the roof as painting progresses. However, if temperature inside should reach 160 deg., a thermostatically controlled siren sounds an alarm and 10 seconds later fire extinguishers automatically go on.

TRACKLESS MINING ups tons per man shift

TRACKLESS MINING equipment requires less common labor and has increased the need for semi-skilled labor. According to the experience of Pend Oreille Mines and Metals Co., Mataline Falls, Wash., trackless mining has increased the tons per man shift and decreased cost per ton to make the operation a profitable one.

Mechanization of equipment has lessened the amount of physical effort and saved time in setting up and tearing down equipment, thereby increasing the time spent in productive work. At the present time 65% of the ore in the Metaline mining district, located in the northeast corner of Washington, is coming from trackless mining headings with 40% of the men. Thirty-five per cent of the ore comes from track mining headings with 60% of the men.

Cost for trackless mining for a 12-month period has been approximately \$1.14 per ton, as compared with \$2.15 per ton for scraper mining. Average tonnage per man, counting drilling, loading, trucking, repair, and development labor, averaged approximately 25 tons per man shift, as compared to 8 tons on scraper mining, counting drilling, scraping, tramming, repair, and development labor. A breakdown of regular mining costs is as follows:

	Track (Cost per ton)	Trackless (Cost per ton)
Mining	\$1.06	\$0.51
Mucking	0.31	0.08
Tramming	0.30	0.17
Supervision	0.15	0.08
Repair	0.33	0.30
Total	\$2.15	\$1.14

Using trackless haulage, it is possible to follow the regularities in the ore and eliminate some drifting waste rock. This means a saving in mining costs. If the block of ore being mined goes up or down, the first horizontal side swipe will follow the slope on a grade favorable for truck haulage. This type of mining has eliminated the manways and ore chutes, waste raises, and drifts required with track and slusher mining methods.

WANTED

California concern would like items to manufacture on Royalty basis or thru purchase of patent, or would like to arrange with present manufacturer East of Rockies for manufacturing rights.

List of plant facilities will be forwarded upon request, and will supply financial statement to responsible parties.

PROGRESSIVE MACHINE CO.

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For more details circle No. 95

WESTERNERS AT WORK

ARIZONA

Tucson Gas, Electric Light and Power Co.

Claude H. Webber is named vice president in charge of gas operations.

CALIFORNIA

Earle M. Jorgensen Co.

Leonard F. Crowley, vice president, is appointed merchandising manager in charge of procurement for concern's steel and aluminum plants and forge division. Jorgensen Forge division, Los Angeles, manufactures open and closed-die forgings.

Henry J. Kaiser Co.

E. T. Larsen is named vice president and manager of engineering for parent company, Kaiser group of industries, Oakland. Prior to joining Kaiser, he was with U. S. Bureau of Public Roads. Dr. W. C. Rueckel is made vice president and manager of development and sales. He was formerly a division manager for Kaiser Engineers.

Carnation Company

William N. Dose, formerly controller, is named general controller of Carnation Co., Los Angeles. Bret H. Reed becomes controller of Evaporated Milk division. He was formerly an assistant controller for

firm. Fred W. Hoover, Jr., is elected a vice president of Albers Milling Co., a Carnation subsidiary. He was an assistant vice president working with production vice president. Francis Albers, Jr., general superintendent of Albers Mill, is also elected to post of vice president.

McCulloch Motors Corp.



C. J. Kaiser David Lewis
McCulloch Motors Corp.

Carl J. Kaiser, previously personnel supervisor, becomes assistant director of industrial relations, Los Angeles headquarters. David Lewis is named maintenance superintendent. He was formerly manager of production control and plant engineering for a McCulloch subsidiary.

Pacific Telephone & Telegraph Co.

Robert L. Black, recently general representative in firm's rates and regulatory group at San Francisco, is named district manager for Southern part of San Diego city and county. He replaces Harry Depert, transferred to staff position at concern's Los Angeles headquarters.

Langley Corp.

I. M. Laddon is elected president of this San Diego firm to succeed Henry I. Mandolf, elected vice president in charge of engineering. Mr. Laddon was formerly executive vice president of Consolidated Vultee Aircraft Corp.

Hydroaire, Inc.

This Crane Co. subsidiary at Burbank, names Robert J. Trivison production manager.

Brea Chemicals, Inc.

This subsidiary of Union Oil Co. of Calif. appoints G. S. Schaffel as manager of research, Brea, Calif.

American Chain & Cable Co., Inc.

F. C. Mohr will be in charge of production at automotive and aircraft division at ACCO's new Los Angeles facility. Allen L. Simms will serve as warehouse office manager.

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Now, MORCK BRUSHES are made with Hog and NEOCETA Bristle . . . and tests from

coast to coast prove them exceptionally fine brushes . . . carry and spread paint evenly and smoothly over a maximum area. (Also made with Hog Bristles and Horse Hair.) From a cost and production standpoint, center your buying around MORCK BRUSHES. Guaranteed to give satisfactory working performance. Consult your supplier, he knows the true values of these brushes.

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WESTERNERS AT WORK

Tubergen Associates

S. S. Stevens joins Tubergen as consultant and engineering representative for N.R.K., manufacturer of general and special waveguides for use in radar, guided missiles, and telecommunications systems. He was previously in charge of antenna research and development laboratory at Douglas Aircraft's Long Beach plant.

Rheem Manufacturing Co.

Lieutenant General Albert C. Wedemeyer (USA Ret.) is elected a vice president and director. He will headquarter in New York City.

General Petroleum Corp.

Gerald Fisher is appointed to position of pollution control coordinator, Los Angeles. He has been manager of lubricants and process products department.

Food Machinery and Chemical Corp.

Jack M. Pope is elected a vice president of this San Jose concern. He is replaced as controller by James N. Kirkwood, former assistant controller.

Western Gear Works

Charles F. Bannan, vice president of this Lynwood, Calif., firm, is named a member of National Board of Field Advisors to the Small Business Administration.

General Dynamics Corp.

David B. Acker is appointed manager of industrial engineering for Convair's San Diego division. Prior to joining Convair, Mr. Acker was assistant manager of West Coast division, Willys Motors, Inc. Ralph L. Bayless is named assistant chief engineer, research and development. Adolph Burstein, previously chief of systems analysis, becomes chief development engineer. Formerly chief administrative engineer, L. O. Cederwall is appointed chief design engineer. H. F. Von Goodat is appointed chief draftsman. K. J. Bossart is now assistant chief engineer in charge of engineering for Convair guided missile project.



D. B. Acker
Convair

J. L. DeDiemar
Resdel Engineering

Resdel Engineering Corp.

J. L. DeDiemar, former Convair design specialist, joins Resdel Engineering, Los Angeles, as chief engineer.

Northrop Aircraft, Inc.

F. Penn Holter joins Hawthorne concern as assistant to administrative vice president. He comes from Curtis-Wright Corp., New Jersey, where he was assistant general manager of Wright Aeronautical division.

American Latex Products Corp.

Norman C. Parrish, formerly process engineer at Northrop Aircraft, becomes assistant manager of plastics division, American Latex Products Corp., Hawthorne. Harry Gerstin moves up from position of division manager to that of vice president in charge of Stafoam division.



N. C. Parrish
American Latex
Products Corp.

E. F. Carter
Stanford Research
Institute

Stanford Research Institute

E. Finley Carter, vice president and technical director of Sylvania Electric Products, Inc., N. Y., accepts position of manager of research operations, Stanford Research Institute, Palo Alto. Dr. James H. Wakelin, former director of research of Textile Research Institute, is appointed consultant to SRI.

Pacific Airmotive Corp.

J. W. Baird is elected to post of assistant secretary, Pacific Airmotive Corp., Burbank. He will continue to serve as military affairs manager, Dayton, Ohio, in addition to his new responsibilities.

General Dynamics Corp.

Convair division, San Diego, names K. J. Bossart as an assistant chief engineer. He has been project engineer for one of Convair's guided missile programs.

Connor Spring Manufacturing Co.

Arthur J. Schwartz is appointed as a job estimator at Connor Spring's Los Angeles plant. He was formerly with Nash Kelvina-tor in time study and production department.

COLORADO

Climax Molybdenum Co.

William Distler becomes assistant mine superintendent of company's operations at Climax. He comes from Miami Copper Co., Arizona, where he has served as underground mine superintendent. Carroll L. Wilson is now director of industrial development for Climax Molybdenum. He is succeeded as president of Climax Uranium Co. by John H. White, Jr. Mr. White will headquarter in Grand Junction.

American Can Co.

Frank R. Grote, Jr., is appointed superintendent of concern's new plant at Denver. He is former assistant to superintendent of manufacture in central division office, Chicago.

IDAHO

U. S. Atomic Energy Commission

Herbert M. Leppich is appointed director of Division of Engineering and Construction, Idaho Operations Office. He replaces Allan C. Johnson, newly appointed

manager of operations office. Mr. Leppich has been serving in a dual capacity of project engineer for construction of installation's chemical processing plant and project engineer for Aircraft Nuclear Propulsion project.

Salmon River Lumber Co.

D. Brannan is named production manager at Riggins. Keith Angleton becomes business manager, and John Thompson is now in charge of woods operations. Harvey Hawkins resigns as general manager.

NEVADA

Consolidated Coppermines Corp.

Arthur J. O'Connor, general manager of Consolidated's operations, Kimberly, is now a vice president of this concern.

OREGON

Factory Motor Co.

Edward G. Bartlow is newly elected vice president of this truck and engine rebuilding firm, Portland. Factory Motor Co. is a wholly owned subsidiary of Consolidated Freightways, Inc.

Cascade Manufacturing Co.

Robert C. Warren is newly elected president of this Portland concern. He succeeds R. W. deWeese, now executive vice president. Company specializes in hydraulic cylinders and lift truck attachments.

UTAH

Standard Uranium Corp.

William R. McCormick, director of Ute Exploration Co. of Utah, is named executive vice president and general manager of Standard Uranium. His assistant will be J. P. Wheeler, who is company's assistant secretary.

Utah Power and Light Co.

R. H. Ashworth, vice president in charge of business development and division operations, retires.

General Motors Corp.

J. S. Chisholm is named manager of Salt Lake City branch, Electro-Motive division, General Motors Corp. He was formerly manager of Electro-Motive factory branch, Los Angeles, Calif.

Salt Lake Chamber of Commerce

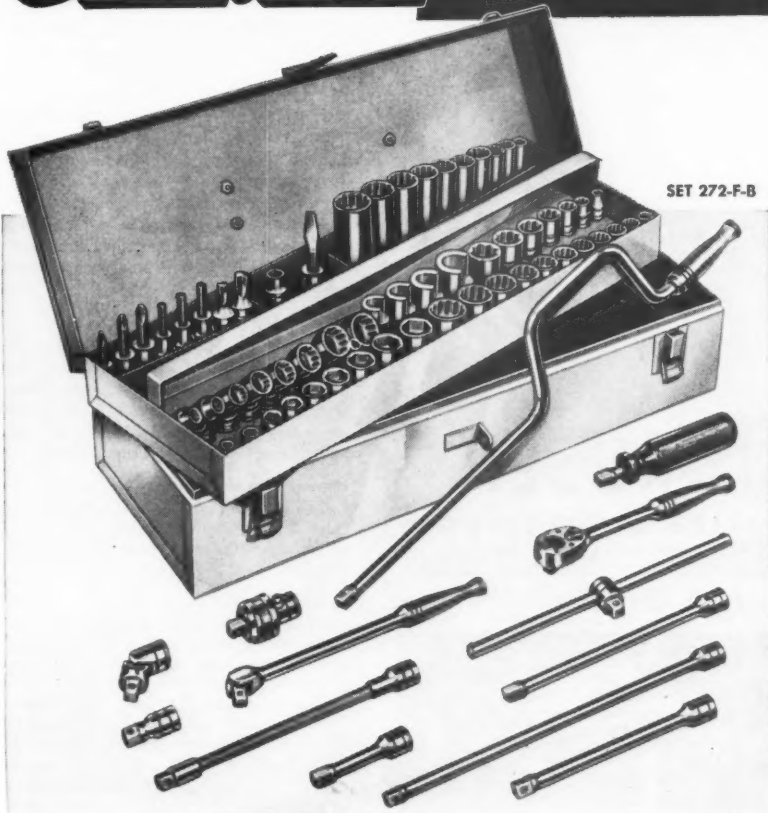
W. T. Nightingale, president of Mountain Fuel Supply Co., is newly elected president of organization. Other new chamber officers are: vice president, Frederick R. Hinckley, president of American Paper & Supply Co.; Harold J. Steele, president of Salt Lake division, First Security Bank of Utah; executive secretary, G. P. Backman; assistant executive secretary, W. E. Hamilton.

WASHINGTON

Pacific Plastics Co.

Albert N. Schrieber joins Pacific Plastics, Seattle, as president. He succeeds Calhoun Shorts, now chairman of board. Mr. Schrieber comes from the University of Washington where he has served as associate professor of production management in College of Business Administration.

Slim-fast-versatile *Snap-on* Ferret Wrenches



—for top speed in tight spots

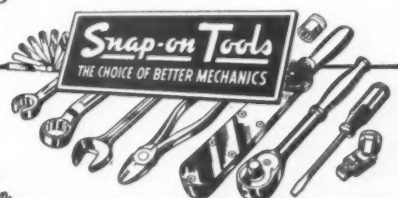
Here is one of the most adaptable, time-saving wrench kits you can put in the hands of maintenance or production workers—a complete set of Snap-on's famed Ferret wrenches. The set includes all handles ($\frac{3}{8}$ " square drive), adaptors, extensions and sockets ($\frac{1}{4}$ " to $\frac{3}{4}$ "), to speed a wide range of jobs. Handles are long, slim, strong, with patented "Palm-Grip" for real working comfort. 4-way socket grip for quickest handle hook-up. Available through your nearby Snap-on factory branch. Write for Snap-on Industrial catalog and general catalog of 4000 hand and bench tools.

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Write for the full facts today.

REVOLVATOR CO.

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WESTERNERS AT WORK

Bethlehem Pacific Coast Steel Corp.

Retired from company's Seattle operations are: *R. P. Herr*, superintendent of rolling mills, Seattle steel plant; *P. H. Guldberg*, plant's chief engineer; and *W. A. Roth*, in charge of reinforcing steel sales in company's district sales office.

Seattle Chamber of Commerce

Stanley E. Stretton is elected president. He is district manager of Standard Oil Co. of Calif. Newly elected vice presidents are: *Frank E. Jerome*, president of Seattle First National Bank; *Harry J. Beernink*, general manager of Washington Co-op Farmers Assn.; and *George M. Dean*, vice president and general manager of Pacific Telephone & Telegraph Co., Washington and Idaho. *James B. Douglas*, president of Northgate Co., is now treasurer of Seattle Chamber.

State College of Washington

Howard W. Barlow joins college at Pullman as director of the Washington State Institute of Technology. He was formerly Dean of Engineering at A. & M. College of Texas. He succeeds *Dr. W. A. Pearl*, now Bonneville Power Administrator.

Lamson Aircraft Co.

Ralph L. Dalton joins this Seattle concern in a managerial position. He was formerly president of a management consultant firm.

H. E. Bovay, Jr.

William N. Pauley resigns vice presidency of Marshall, Neil and Pauley, Inc., of Houston to take charge of newly opened Pacific Northwest office, Spokane, of H. E. Bovay, Jr., a Houston consulting engineering firm. *Charles G. Alger* leaves Diamond Match Co.'s staff to join Spokane office of Bovay.

WYOMING

The Kemmerer Coal Co.

Company at Frontier elects *G. E. Sorenson* president.

ASSOCIATIONS ELECT

Southern California Tool and Die Assn.

President, *Russell Lamb*, Tool-Matic Co.; vice president, *Joe Matheny*, B & M Engineering Co.; treasurer, *Harold Murock*, Arrowsmith Tool and Die Corp.; secretary, *Ben Hazewinkel*, Daily Grinding Co.

Asphalt Institute

President, *Jesse E. Buchanan*, formerly president of University of Idaho.

American Material Handling Society,

Denver Chapter:

President, *Garard Renzelman*, division superintendent, raw material stores and interdepartmental trucking, Gates Rubber Co.; vice-president, *Al Erickson*, assistant operations manager, Morey Mercantile Co.; treasurer, *R. L. Rickenbacker*, methods engineer, Ringsby Truck Lines; secretary, *Carter Dana Malchow*, chief engineer, Denver Union Stockyards.

Manufacturers' Agents Nat. Assn.:

President, *F. R. Young*, Seattle; vice president, *E. A. Wilcox*, San Francisco; executive treasurer, *A. B. Smedley*, Altadena, Calif.

Northwest Electric Light and Power Assn.:

President, *R. C. Setterstrom*, Montana Power Co., Butte, Mont.; first vice president, *E. M. Maughton*, Utah Power & Light Co., Salt Lake City; second vice president, *R. E. Gale*, Idaho Power Co., Boise.

Washington Metal Trades, Inc.:

Treasurer, *Frank DeBruyn*, Isaacson Iron Works, Seattle.

Tubular Exchanger Manufacturers Assn.:

President, *Gustav B. Faust*, a vice president of Southwestern Engineering Co., Los Angeles.

Inst. of Radio Engineers, Los Angeles section:

Vice chairman, *Walter E. Peterson*, supervisor of radio-radar development, Northrop Aircraft, Inc.

Personnel Management Assn. of San Diego:

President, *Robert S. Putman*, manager of industrial relations, Solar Aircraft Co.; first vice president, *Frances B. Torbert*; second vice president, *Arthur L. Anderson*; secretary, *Lucile Zueck*; and treasurer, *Myron Insko*.

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Low Volume: 1 to 80 gallons per minute.

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CHAIN
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PIPE LINES**

*The FAST,
SURE,
ECONOMICAL
WAY!*



TRADE WINDS

News about those who distribute and sell industrial equipment and materials

Hyster sales scientists



L. W. Krumbein R. M. Taylor
Hyster Company

Lewis W. Krumbein is named coordinator of lift truck promotion for Hyster Co., Portland, Ore. He has been company's market research director for past five years, and is succeeded by Richard M. Taylor, who joined company over a year ago.

Boand heads L.A. branch

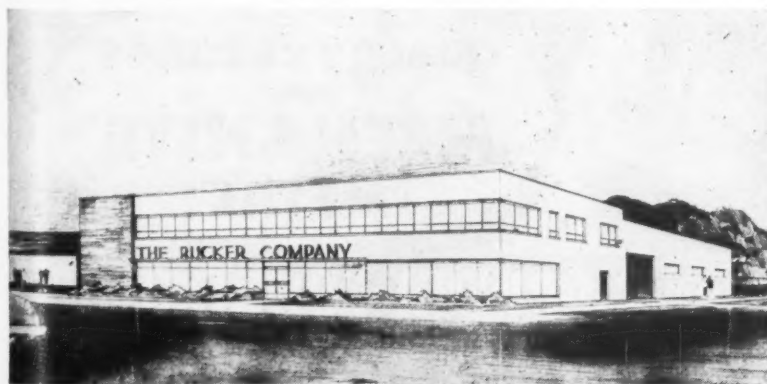
Jules F. Boand, Jr., is appointed Pacific Coast manager of sales and technical service by Titanium Metals Corp. of America, with Los Angeles headquarters. He was formerly employed on firm's home office sales staff in New York, and earlier as a sales engineer with National Lead Co. in Chicago.

Brickley in Northwest

Donald F. Brickley is appointed manager of sales in Pacific Northwest for Motorola Communications and Electronics, Inc., Chicago. He comes West from position as zone manager for company in northern Illinois. Company's Region I now covers Idaho, Montana, eastern Nevada, Washington, Wyoming, and Utah, with headquar-

New Rucker plant in Oakland

Rucker Co., Oakland, Calif., is building this new warehouse and plant to consolidate and expand operations now in two separate buildings. Contractors for building, which has 21,000 sq. ft. of floor space, are Christensen & Lyons of Oakland. Company is a distributor of hydraulic systems and components, and designs and engineers fluid power systems for aircraft, automotive, and other industries.



ters in Portland. Northern California, formerly part of Region I, is now served by Los Angeles regional headquarters.

Western trio

Unistrut Corp., Wayne, Mich., appoints three new district managers in the West: Robert Stiles, in charge of San Francisco territory; L. Daly, who will manage the Northwest district, with his office in Seattle; and Larry Springer, who will cover the Southwest district, with Los Angeles headquarters.

Keville sells American

Keville Industrial Service, Inc., Pomona, Calif., is appointed Southern California and Nevada distributor for American Engineering Co., Philadelphia. This covers sales and service of Low-Hed electric industrial hoists and car pullers.

Gay in Denver

L. B. Gay is named district manager of Allis-Chalmers general machinery division in Denver. He succeeds Paul R. Pollock, who is now Mid-Atlantic regional representative in Philadelphia. Mr. Gay joined Allis-Chalmers in 1940 and has been in company's New Orleans district since 1946.

Boman Co. adds tire line

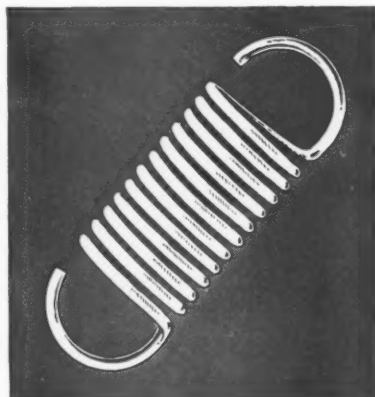
Boman Co., Los Angeles, is appointed exclusive stocking distributor in California and Arizona for Mitco line of airless and tubeless industrial tires manufactured by Mitchell Industrial Tire Co., Inc., Chattanooga, Tenn.

Heads chemical sales for Kaiser

Russell T. Drennan becomes general sales manager of Kaiser Chemicals Division, Oakland, to supervise regional offices in Akron, Chicago, and Oakland, as well as subsidiary

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For further information write Ira G. Perin, 575 Howard St., Dept. W, San Francisco 5, Calif.

West Coast Representative
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TRADE WINDS

district offices, for sale of alumina, magnesite, magnesite, basic refractories, and other products. He joined Kaiser Chemical in 1946 and last held position of eastern general sales manager in Akron.

Shell game

J. L. Wadlow, general sales manager for West Coast divisions of Shell Oil Co., moves to same post on East Coast, in exchange of territories among East Coast, Midwest, and West Coast managers. Selwyn Eddy, Midwest general sales manager, takes over on West Coast.

Returns to the West

Darrell R. Nordwall is named manager of Crane Co.'s Los Angeles branch, transferring from New York branch, where he has been manager since early 1953. A native of Los Angeles, he joined company at its Phoenix branch in 1932 and has also been assigned to its home office in Chicago and branch in Boston. He succeeds George C. Perry, now on indefinite leave of absence because of ill health.



D. R. Nordwall
Crane
Co.



T. J. Jeanneret
Harnischfeger
Corp.

In charge of Pacific division

Thomas J. Jeanneret is named general manager of P&H Pacific division of Harnischfeger Corp., Milwaukee, to direct sale activities in Los Angeles and eleven Western states. Formerly manager of P&H Denver office, he succeeds Ralph D. Holcomb, deceased. Paul Diefenderfer is appointed manager of all plant, service and repair parts operations in Pacific division. He has been with company for 18 years, since 1951 in its Pacific division. P&H products in-

clude power shovels and cranes, electric hoists, welding machines, diesel engines, and soil stabilizers.

Spratt joins Oakite

Jerome E. Spratt joins Los Angeles staff of Oakite Products, Inc., manufacturer of industrial cleaning and metal treating materials. For past 14 years he has been with Mission Appliance Corp. in Hawthorne. He has now completed Oakite's 8-week training course in New York and will be assigned to metal working industries in Los Angeles area.



J. E. Spratt
Oakite Products,
Inc.



Richard Finfrock
Ducommun Metals
& Supply Co.

New manager—new division

Richard Finfrock is appointed manager of Ducommun Metals & Supply Co.'s new San Diego division, occupying new building recently opened in National City, Calif. He has been with Ducommun since 1935 and moves to his new post from Los Angeles, where he was sales manager. New warehouse and office facilities, built and equipped at total cost of about \$700,000, will stock stainless steel, aluminum, brass, and copper, and production tools and materials.

Moved

E. A. Stevenson Co., distributor of Rapids Standard conveyor equipment, moves to 820 Santa Fe Ave., Los Angeles.

Successor to Murry Jacobs Co.

Equipment Supplies, Inc., new Seattle corporation, acquires materials handling and packaging machinery business of Murry Jacobs Co. of Seattle. Vice-president and general manager of new company is Edward E. Masterson; secretary-treasurer, David R. Masterson; district sales manager, Charles E. Houser, formerly with Universal Car-

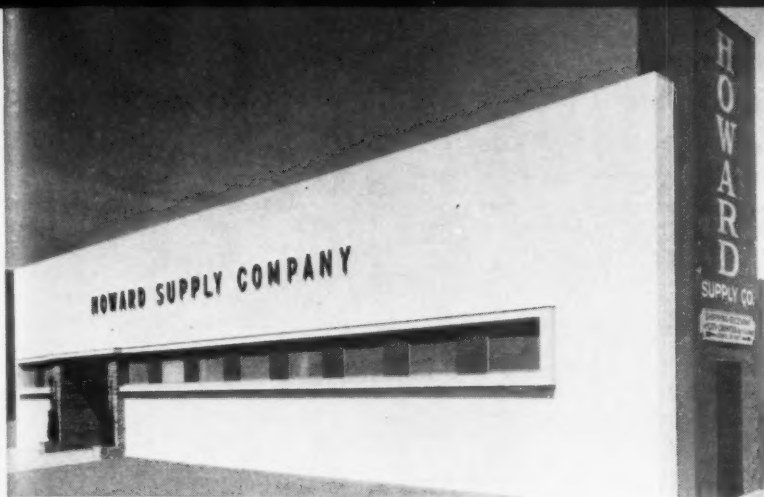


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Howard Supply moves

New industrial warehouse in Oakland is now serving Howard Supply Co.'s Northern California division. Increased space will be used to stock a widening line of industrial supplies for customers in California north of Fresno and in northern Nevada.

loading and Distributing Co.; and Edward M. Barnes is in charge of government contracts and sales.

Promotions at Alcoa

William F. Courter, formerly of Los Angeles district sales office, succeeds James A. McGowan as assistant product manager for sand and permanent mold castings, with headquarters at Vernon works of Aluminum Co. of America. Mr. McGowan goes to New York as assistant district sales manager.

Grant in command

R. B. Grant is appointed Los Angeles branch manager of Minneapolis-Honeywell Regulator Co. He joined the company about 14 years ago, as a sales engineer in industrial division, San Francisco. Since 1941 he has been attached to the Los Angeles office, with promotions to branch industrial manager in 1946 and regional industrial manager in 1949.

San Francisco manager

Richard T. Coen is appointed manager of San Francisco operations of L. H. Butcher Co., subsidiary of the Udylyte Corp. and distributor of industrial chemicals and allied products.

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Engineering—Equipment

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PLeasant 2-6141

For more details circle No. 231

Link-Belt builds in Portland

New district sales office and warehouse building is under construction in Portland for Link-Belt Co. of Chicago. Austin Co. is designer and builder. Company, which manufactures conveying, processing, and power transmission equipment, now has a factory branch store in Portland.

Automatic appointment

Hahn Equipment Co., Denver, becomes a distributor for Automatic Transportation Co., Chicago.

For Safety's Sake . . .
Buy GOLD SEAL



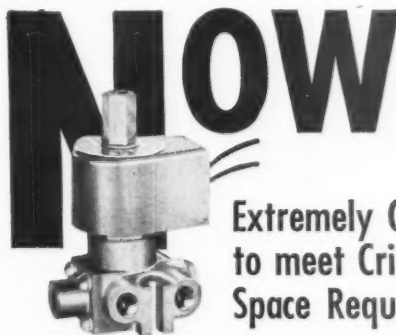
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NOW ASCO has available a complete line of MIDGET 2, 3 & 4-way solenoid valves . . . an important addition to the thousands of types and sizes in the standard ASCO line. Every ASCO valve is backed by years of experience in the field of electromagnetic controls.

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RAILROAD CLEARANCES offered by PUC

SEVERAL COSTLY EXAMPLES of failure to comply with safety regulations during the design period in railway loading facilities are provided by the California Public Utilities Commission. A copy of the Commission's clearance orders outlining all regulations in detail may be obtained by writing the Commission's secretary at the State Building in San Francisco or the Mirror Building in Los Angeles.

A major oil company not long ago built a loading rack alongside a railroad track. The rack was of steel construction with provision for loading on two sides. There were 14 retractable gangways 14 ft. high, which, when they were swung back from the cars, provided a vertical clearance of 7 ft. 6 in. That was a costly error in construction since, according to safety regulations, the clearance should have been 8 ft. 6 in. The cost of reconstruction to comply with safety regulations for the loading rack amounted to \$5,000.

In Emeryville a concrete platform 4 ft. high was built with a side clearance from the center line of the track of 7 ft. 3 in. A brick building 14 ft. high then was built on top of the platform with the same side clearance of 7 ft. 3 in., and a roof overhang extended to within 7 ft. of the center of the track. The track could not be moved away from the building and rebuilding posed a serious problem of expense and inconvenience.

RADIANT HEATING installation

SATISFACTORY experience with floor-type radiant heating in the original plant of Hewlett-Packard Co., Palo Alto, Calif., led to the selection of a similar heating system to serve 28,000 sq. ft. of additional research and manufacturing area.

The heating system is fabricated of 1-in. wrought iron pipe coils, spaced on 18-in. centers and embedded in concrete. In the test area of the original building, heated water is circulated through the iron pipe coils embedded in the concrete floor economically enough to heat the 21,000 sq. ft. at never more than \$60 a month.

A dry floor with even distribution of heat throughout the plant contributes to the working comfort of employees and reduces the danger of dampness.

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THE *West* ON ITS WAY

NEW PLANTS, EXPANSIONS, NEW INDUSTRIES, PRODUCTION CONTRACTS,
DEVELOPMENT PROJECTS, UTILIZATION OF RESOURCES

Gas - Electricity - People

Could New Mexico be another Texas?

New Mexico had estimated proved natural gas reserves of 14,038,889 million cu. ft. in 1952, and a net production of 442,000 million cu. ft., according to a study, "Natural Gas in New Mexico" by the Bureau of Business Research, University of New Mexico.

But the possession of huge natural gas reserves in two opposite corners of the state has not worked out to the benefit of New Mexico consumers, says Vicente Trevino Ximenes, author of the study.

Artificially low field prices permit uneconomical use of the gas, in his opinion, and its use in carbon black should be specifically curtailed by law. Despite the low well price, the average price to consumers is conspicuously higher than in many other states, including distant states which are now receiving New Mexico gas by pipeline, he states.

If the gas were kept in the state, he predicts that it could become the basis of chemical and other industries such as have already enriched the Texas Gulf Coast.

Impact of natural gas on Northwest

Distributors estimate that natural gas will be cheaper than oil or electricity for comparable uses within three years of its delivery to the Pacific

Northwest, according to the Seattle-First National Bank's quarterly review.

This means most new homes will be equipped for gas, and distributors will concentrate initially on space heating, water heating, refrigeration, and clothes drying; later, on domestic cooking.

Gas to supplement

The bank says that gas will supplement, rather than replace, any part of the present energy base, and that electricity in particular will not suffer even a slowing of its growth rate. Gas will not make inroads in the electro-process industries, and the displacement of electricity in homes will be offset by new industrial uses made possible by combination with natural gas.

Industries which may well fit into an interruptible load pattern include: food processing, cement, brick, lime, other building products, plywood, pulp and paper, primary metal users and fabricators, mining operations, and chemical plants.

Sag only slight

As population in Southern California is expanding at the rate of close to 4% a year, the per capita volume of business is now about 7% below the extreme peak of 1953 and only 2½% below the average level for the entire year, according to the research department of Security-First National Bank of Los Angeles.

"Shine, Little Light Bulb, Glimmer"

Eight Western states will be consuming light bulbs by 1960 at a yearly rate of 220,000,000, nearly half of America's pre-war total, if current growth patterns continue, according to Garlan Morse, Pacific Coast director of sales for Sylvania Electric Products, Inc.

Arizona, California, Idaho, Montana, Nevada, Oregon, Utah, and Washington had 5,500,000 homes with electric light in 1950, compared to around 4,000,000 in 1940, he reports, a much greater growth rate than for the nation as a whole. Sylvania has established three factories and laboratories in California in two years.

Comparative costs of electricity

Here are the comparative costs of producing electric power per kilowatt-hour for the Pacific Northwest, as set forth by Ivan Bloch, industrial consultant, at a meeting of the Portland City Club:

	Cost (mills)
Fuel oil	6.3
Coal	6.5-7.6
Natural gas	5.9-6.4
Nuclear fission (possible)	6.7
Hydro	2.5

He predicted the construction of thermal plants in the area as supplements to hydro, rather than as substitutes.

ALASKA

OIL AND GAS HUNT—Standard Oil of Calif. contracts with Department of Interior to spend up to \$450,000 in exploration for oil and gas on Kenai Peninsula of Alaska. Phillips Petroleum Co. is reportedly moving ahead on \$2,000,000 contract for exploration of 1,000,000 acres in Yakutat-Katalla area of mainland. Oil lease rush in areas of Cold Bay and Wide Bay follows opening of this former naval petroleum reserve to private development.

POWER PLANS—British Columbia government grants conditional water license for Yukon River watershed in Canada to Northwest Power Industries Ltd., subsidiary of Quebec Metallurgical Industries and Frobisher Ltd. Group of companies, which includes Reynolds Metals Co., is reported to be planning \$270,000,000 development of hydro-electric projects and smelters by 1962. Proposed Skagway power project, backed by Aluminum Co. of America, which would have used Yukon water from Canada, appears to be out.



EAGLE MOUNTAIN ORE PLANT—Kaiser Steel Corp.'s plant at Eagle Mountain, Calif., about 200 mi. east of Los Angeles, begins operation, processing iron ore from company's open pit mine. Ore with average iron content of 51% goes from primary crusher (lower left) to magnetic and heavy media separation units in building (upper left), with ore product of 56% average iron content. Plant capacity is over 2,000,000 tons per year. Higher-grade ore will make possible transportation and blast furnace economies.

ARIZONA

BEE MOLD EXPANDS—Bee Mold & Die, Inc., Phoenix firm which began operations this year, plans to add 300 workers for production of new bomb hoist under Air Force contract amounting to over \$1,000,000. Firm is working on two other government contracts.

DESERT POWER PLANT—Saguaro steam-electric power plant, 30 mi. north of Tucson, is in operation, with initial capacity of 100,000 kw. First turbogenerator was placed in operation July 1, and second, of like capacity, is scheduled to start in February 1955. Fuel used is natural gas.

ADD SECOND FLOOR—AiResearch Manufacturing Co. awards contract to Utah-Kitchell-Phillips Contractors, Inc., to add 20,000 sq. ft. of floor space to firm's office building in Phoenix. A second floor will be added to building without interruption of operations in plant or offices.

METAL PIPE PLANT—Armco Drainage and Metal Products, Inc., subsidiary of Armco Steel Corp., Middletown, Ohio, plans to build \$100,000 plant in Kyrene industrial area near Phoenix for

fabricating corrugated metal drainage pipe. Plant and related sales offices will employ about 15 persons.

NEW PHOENIX PLANT—Regan Engineering Corp. of Milwaukee, Wisc., will build new plant in Phoenix for manufacture of special industrial heating units, employing 150 persons, and will move head offices here.

BUY COOK PLANTS—Sunset Oil Co., Los Angeles, acquires bulk plants at Phoenix and Casa Grande and 40 station outlets of Cook Oil Co. in Maricopa, Pinal, and Gila counties.

RADAR PLANT—Government solicits bids on construction of \$2,000,000 Air Force radar installation outside Winslow, covering about \$339,000 for construction costs and remainder for radar equipment.

CALIFORNIA

LAUNCH WESTERN DIVISION—Glass Fibers Inc., Toledo, Ohio, sets up Western Division for company's manufacturing and sales activities in 11 Western States, headed by M. Dean Worcester,

vice president. New plant and warehouse at Burbank, replacing facilities destroyed by fire last year, will continue to produce insulation components for aircraft industry.

G-E LAB AT STANFORD—General Electric Co. establishes new electron tube laboratory, working closely with research laboratories at Stanford University, which will be housed before end of the year in new building to be leased by G-E from Stanford. Research will be in development and application of microwave electron tubes in commercial and military communications.

KAISER BUYS NEST-A-BIN—Willys Motors, Inc., subsidiary of Kaiser Motors Corp., buys business of Nest-A-Bin Co., Denver, and begins production of a redesigned model of this aluminum-alloy bulk shipping container at its San Leandro plant.

JET ASSEMBLY LINE—Douglas Aircraft Co. begins building three-unit steel building at its El Segundo plant for assembly of Navy's new A4D Skyhawk, jet combat plane. Holmes and Narver, Inc., Los Angeles, designed the building, which will cost about \$1,500,000 and be ready for occupancy by November 15.

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The Lufkin Line

A PEDDLER'S HOLIDAY

California air has been extolled by chambers of commerce from Crescent City to Chula Vista for its ultra violet ray content and the Texans have a word for it too. But one of its unsung qualities unquestionably is durability.

Without losing an ounce of it, California air, 30 lbs. to the tire, supported us on a vacation trip through the states of Oregon, Idaho, Wyoming, Colorado, Utah and the fringes of one or two others.

A wonderful trip in which the kids did not even turn up with a bellyache.

As trite as the travel folder's slogan may be, seeing the grandeur of the Columbia River Gorge, Yellowstone, Bryce, Zion and the Rockies of Colorado cannot help but bring renewed pride to the wonderful country in which we live.

To make such a trip doubly enjoyable it was nice to find a few friends along the way.

R. C. "Bud" Kelly, Executive Manager of the Cooling Tower Institute at Palo Alto, is probably one of the finest guys we know. Bud's graciousness and hospitality can only be matched by his infinite capacity for work. Palo Alto is the nerve center for the vast cooling tower industry.

In Portland it was good to see Stan Wagner and Rod Anderson again, who do such a swell job of running the show for J. W. Minder Chain and Gear in the Northwest.

Wayne Glenn, Continental Oil's Assistant Regional Manager in Denver, asked to be remembered to all of his California friends. Truly a favorite, it was a real pleasure to put our feet under Wayne's desk again.

To our customers, many thanks for a swell vacation.

Via Facsimile

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PACIFIC COAST DIVISION

5959 S. Alameda St., Los Angeles 1, Calif.
Dallas Lufkin, Texas New York

Lufkin produces the finest . . .
Industrial Gears Pumping Units



LOCKHEED SPURS MISSILE STUDY

—Lockheed Aircraft Corp., Van Nuys, sets up new \$10,000,000 laboratory program for advanced research by its Missile Systems division. Director is Dr. E. H. Krause, recently associate director of research at Naval Research Laboratory in Washington, assisted by Montgomery H. Johnson, associate director.

LEASE WAREHOUSE—Mansfield Tire and Rubber Co. of Mansfield, Ohio, will move its West Coast warehouse in December to new \$300,000 building now under construction in East Oakland by Van-Bokkelen-Cole Co., Oakland. Pacific Tire and Rubber Co. will also use space in warehouse.

PRODUCT EXPANSION—Enterprise Engine & Machinery Co., subsidiary of General Metals Corp., San Francisco, will broaden its product lines by adding diesel power units up to 5,000 hp. Largest ratings up to now have been 2,700 hp.

CAT CRACKER AT WORK—New \$20,000,000 catalytic cracker at El Segundo refinery of Standard Oil Co. of California begins operation, adding capacity of 40,000 bbl. daily to production of high-grade fuels.

NEW BOX CARS—Southern Pacific Co. will build another 1,500 large size box cars in its Sacramento shops, supplementing an earlier authorization for 1,250 box cars now being delivered.

LEASE SHOP AT SHIPYARD—Chase Aircraft Co., Inc., subsidiary of Willys Motors, Inc., which is owned by Kaiser Motors Corp., leases machine shop at Shipyards 3 in Richmond from U. S. Maritime Administration. Shop, which adjoins Richmond machining division plant of Willys Motors, will be used initially for aircraft machinery storage.

FRIDEN IN HOLLAND—Friden Calculating Machine Co., Inc., San Leandro, buys factory in Wageningen, Netherlands, and will organize subsidiary, Friden Business Machines, N. V., for production of calculators and adding machines.

DU PONT MAY BUILD—Du Pont Co. of Wilmington, Del., acquires options on land in California for possible construction of plant to manufacture tetraethyl lead and Freon refrigerants.

INVENTION PATENTED—William Costa, partner in Diesel Engineering Co., San Diego, receives U. S. patent for new ship propulsion device attached outside ship's hull, replacing ordinary engine room and long propeller shaft. Plans to develop the invention include formation of proposed Bilco Ship Construction Co. and conversion of a Liberty-type ship in San Diego.

FMC BUYS TWO PLANTS—Food Machinery and Chemical Corp., San Jose, acquires Fairfield, Maryland, plant of National Distillers Products Corp.'s U.S.I. Division. Plant, which produces pesticide chemicals, will be operated as

Fairfield Chemical Division of FMC, under firm's Niagara Chemical Division. FMC also acquires Chicago Pump Co., Chicago, a producer of specialized equipment in waste disposal and building fields, to be operated under Peerless Pump Division.

INCORPORATE FIRM—E. A. Thompson Co., Inc., succeeds By-Chemical Products Co., San Francisco and King City, as manufacturer of floor finishes, polishes, waxes and cleaning compounds. All products will use trade name "Thompson's."

PLANT ADDITION—Golden Grain Macaroni Co., San Leandro, plans \$150,000 plant enlargement which will add 27,000 sq. ft. of floor space for manufacturing and sales operations.

CORPORAL ADVANCES—Firestone Tire & Rubber Co. is expanding missile manufacturing facilities with 350,000-sq. ft. plant now under construction at a cost of \$2,000,000 next to company's main tire plant in Los Angeles. Firestone has contract for production of Army's Corporal guided missile.

CRUDE OIL LINE—Union Oil Co. will build 12-in. pipeline in autumn to bring crude oil from its Santa Clara Valley fields to refinery in Los Angeles, a distance of 65 miles. Initial capacity will be 60,000 bbl. per day, which may later be increased to 75,000 bbl. through added pumping station.

NEW PLANT AT SAN LEANDRO—National Cylinder Gas Co. moves into new building at San Leandro, first unit in projected expansion of company's Northern California district facilities, and work starts on acetylene plant at same site. Company's home office is in Chicago.

GYROSCOPES—Clary Multiplier Corp., San Gabriel, receives additional orders for \$1,000,000 in gyroscope instruments for guided missile production.

ENTER PLASTICS ARENA—Arrow-smith Tool and Die Corp., Los Angeles manufacturer of builders' hardware and metal tooling for industry, buys 10,000-sq. ft. plant and forms new firm, Arrow-smith Plastic Tooling, Inc.

MORE CONCRETE PIPE—United Concrete Pipe Corp. triples capacity of its plant at Baldwin Park producing centrifugal reinforced concrete pipe, with plant addition and new equipment.

TAPAMATIC PLANT—Tapamatic Corp. completes first unit of new plant in Costa Mesa, near Los Angeles, for production of tapping attachments. Company has been in operation for about one year in Banning.

CONVAIR—Convair division of General Dynamics Corp., San Diego, is building \$100,000 electronic computer research building adjacent to its new engineering building at Plant I. Research activity will employ about 50

For more details circle No. 235

persons. A test facility on Point Loma for Air Force guided missile program is also under construction by Convair, to cost \$250,000. Structures will be used only for testing components and systems of missiles. Air Force is buying 33 Model 340 Convair-Liners under two contracts, the original \$13,000,000 one for 21 planes and a supplemental one for \$7,000,000 covering 12 additional aircraft. All planes will be delivered by April 1955.

AERIAL SURVEYS—Hycon Aerial Surveys, division of Hycon Manufacturing Co., Pasadena, receives about \$1,250,000 in contracts for aerial surveys in United States and abroad.

LUCKY IN SAN FRANCISCO—Lucky Lager Brewing Co. begins \$4,125,000 expansion of its San Francisco brewery, to cover construction of five new buildings scheduled for operation next year.

MAY BUILD IN CANADA—Crown-Zellerbach Canada, Ltd., affiliate of Crown-Zellerbach Corp., San Francisco, has purchased a 150-acre site on Lulu island for proposed \$2,000,000 paper converting plant and is also considering a \$15,000,000 expansion at its Elk Falls location on Vancouver island, to include a kraft pulp plant and pulp drying facilities.

ADD DOG FOOD—Standard Brands, Inc., buys Kendall Foods, Inc., Los Angeles, producer of dog food, to be operated as a division of Standard Brands.

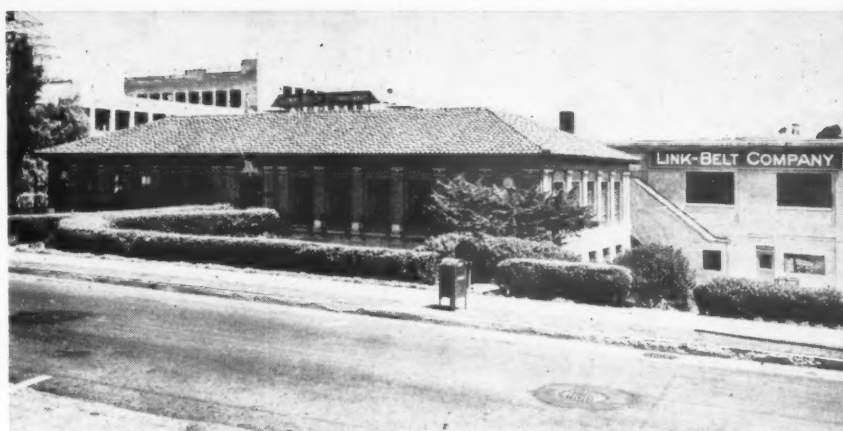
BUILD IN WHITTIER—Alloy Rod and Metal Division of Victor Equipment Co., San Francisco, begins construction of 6,000-sq. ft. plant in Whittier, to cost about \$200,000 with equipment, for manufacture of welding rods. A second building will be begun when the first is completed in October. Company has no plans to move operations from leased quarters in Lynwood at this time.

FILM COMPANY GROWS—Republic Pictures Corp. plans \$1,000,000 improvement of lot facilities, including office building, projection and cutting rooms, and equipment, in North Hollywood. This is part of a three-year expansion with an estimated cost of \$3,000,000.

DOUBLE PAINT OUTPUT—Walter N. Boysen Co., Los Angeles, is building \$165,000 plant addition, to be completed in fall, which will more than double production.

MERGER—Two auto accessories firms in Los Angeles area merge. Bonzer Manufacturing Co., Inc., of Long Beach will combine with Western Products Co., Inc., and move production to that firm's Los Angeles plant, for operation under new name of Bonzer-Western Corp.

COURT ORDER—Federal court in San Francisco orders major canning companies to sell peach pitter machinery instead of requiring its lease by users. Companies involved are California Packing Corp., Libby, McNeill and Libby Co., Food Machinery and Chemi-



EXPAND AT SAN FRANCISCO—Link-Belt Co. builds three-story addition to its San Francisco plant to house increased manufacturing, engineering, and warehousing facilities and a factory branch store. D. E. Thal is general manager of company's Central Pacific division. Home office in Chicago.

cal Corp., and Pacific Machinery Co. (which judgment directs to be dissolved).

REBUILD—General Fusing Co. is replacing its Hayward plant, damaged by fire, with new \$200,000 plant in Oakland now under construction, for metal plating operations.

INSTALL SMELTERS—Ferro Corp., Cleveland, will add two continuous smelters to its Los Angeles porcelain enamel plant, to cost about \$135,000.

MONEY MAKING—Construction starts on \$180,000 branch plant in Los Angeles for Todd Co., Inc., Rochester, N. Y., manufacturer of bank checks.

SPORTSWEAR—White Stag Manufacturing Co. undertakes \$200,000 expansion of its San Francisco factory for wearing apparel, to be completed by November.

SOLAR SCHOLARSHIPS—Two college scholarships, each for \$1,600, will be awarded annually by committee acting for Solar Aircraft Co. to high school graduates in families of employees at Solar's San Diego plant.

FORD EXPANDS ASSEMBLY PLANT—Capacity of Ford Motor Co.'s assembly plant in Los Angeles will be enlarged with \$500,000 building and improvement program, part of \$13,000,000 development throughout country for Ford's Lincoln-Mercury division.

ON THE SMOG FRONT—Studies now launched by Southern California Air Pollution Foundation, with support from Los Angeles County Air Pollution Control District, include an airmetric survey to collect facts on ozone concentration, nitrogen dioxide, and wind patterns; a plant damage study; research on composition of automobile exhaust (to be performed by Midwest Research Institute of Kansas City, Mo.); eye-irritation survey; meas-

urement of contaminants from aircraft; measurement of aerosol masses. Los Angeles Department of Water and Power has enlisted New York University's College of Engineering to study elimination of low-lying gases discharged from its Harbor steam plant, using scale model of plant in a special "smoke tunnel" to simulate local conditions.

Air Pollution Control District reports smog control regulations on gasoline storage tanks are being complied with by all oil refineries ahead of schedule. Gradual program has a final deadline of May 1, 1955.

KAISER GYPSUM BUILDS—New \$110,000 plant for production of plaster retarder is added by Kaiser Gypsum Co., Inc., to its gypsum plant at Long Beach.

GROWING—Byron Jackson Co., Los Angeles, buys The Rollin Co. of Pasadena, manufacturer of high-precision testing equipment for electronic devices, to be operated as part of BJ's electronics division. Company plans to acquire or build a new plant for expanded engineering and manufacturing in electronics field.

WORKING ON NEW WAREHOUSE—American Can Co. is building new lithographing and warehousing building next to its Pacific factory in San Francisco. Construction has begun on three-story plant by J. H. Pomeroy & Co., Inc.

COLORADO

NATURAL GASOLINE—Continental Oil Co. is building \$2,000,000 natural gasoline plant and gas gathering system about 30 mi. south of Brush. Plant is scheduled to be in operation Nov. 1, with capacity for processing 10,000,000 cu. ft. of gas daily, and producing natural gasoline, propane, and butane. Eight other oil companies are behind project, which will be operated by Conoco.

MOVING TO DENVER—Can-A-Pop Beverage Co. will move its Sheridan, Wyo., plant—the company's initial venture into soft drink canning—to Denver to gain shipping economies. Company now has three other plants in Midwest and West.

AIR ACADEMY BUILDERS—Skidmore, Owings and Merrill, Chicago, are awarded contract to design and build \$145,000,000 air academy at Colorado Springs.

MORE SPACE—Standard Furniture Co., Denver, moves to new 60,000-sq. ft. plant, triple the size of its former quarters, and looks forward to expanding personnel from present 60 to 100.

NEW PROJECTS—Denver Research Institute of University of Denver is awarded research contracts totaling \$130,000 by six separate organizations: Denver Plastics, Inc.; Dry-o-Scent Co.; and Robert Murry, all of Denver; U. S. Naval Air Missile Test Center, Point Mugu, Calif.; Air Force Personnel Training Research Center, Lackland Air Force Base, San Antonio; and Foreign Operations Administration, Washington, D.C.

IDAHO

ADD EIGHTH TANK—Utah Oil Refining Co. is expanding storage capacity at its Boise refinery with a 1,764,000-gal. tank, now under construction at cost of \$150,000 by Chicago Bridge and Iron Co. and Morrison-Knudsen Co.

INCORPORATE—Idaho Natural Gas Co. is organized and applies to Idaho Public Utilities Commission for certificate to distribute natural gas in southern Idaho.

BOISE INVENTION—I. E. Mayne Plumbing and Heating Co. of Boise will manufacture invention of its employee, Adrian Kimmell, for assembling soil pipe and fittings. Device for holding pipe is claimed to cut assembly time by one fourth.

FPC PERMIT—Federal Power Commission approves 18-month preliminary permit to Pacific Northwest Power Co., Spokane, for investigating and planning (but not constructing) proposed hydroelectric project at Bruce Eddy and Penny Cliffs on forks of Clearwater River in Idaho. Company represents Montana Power Co., Washington Water Power Co., Pacific Power and Light Co., and Portland General Electric Co.

PUMICE FIRM BUILDS—Pumice Products and Builders Inc., Boise, is expanding warehouse, office and plant space with building addition now under construction.

WILL USE WOOD WASTE—Construction begins on \$750,000 plant at Sandpoint for Pack River Lumber Co. Plant, to be in production next summer,

will employ about 50 men in manufacture of board from wood slabs and edgings, using new process invented by Dr. James d'A. Clark of Longview, Wash.

MONTANA

OIL MOVES WEST—First deliveries of petroleum products from partially completed Yellowstone pipeline are made at Bozeman. Line begins at Billings, Mont., and will extend West to Spokane. Laying of pipe has not been completed in several mountain stretches along route.

NEVADA

RENO HEADQUARTERS—Survey team recommends and Secretary of Interior McKay approves selection of Reno as headquarters of Bureau of Mines' reorganized Region 1, covering Nevada, California, Oregon, Idaho, Washington, and Alaska. Offices will be located in new Bureau of Mines building at University of Nevada. Move is to be completed by July 1, 1955.

OREGON

CORVALLIS PLANTS—Warren Northwest, Inc., is producing asphalt east of Corvallis for street and highway paving work, and new Island Sand and Gravel Co. is starting operations in same location to supply gravel for highway and other uses.

ORE REDUCTION PLANT—Laughlin Alloy Steel Co., newly organized \$1,500,000 firm, is equipping plant in White City, north of Medford, for ore reduction operations. Full production employing 255 men is scheduled for end of 1955. Plant will process chrome, manganese, and tungsten and also produce high-grade alloys using scrap steel.

PGE SERVICE CENTER—Portland General Electric Co. plans \$1,100,000 service center in Portland which will include new office building for distribution, line, and repair departments, transformer shop, and modification of existing warehouse. Architect is Glenn Stanton, Portland.

REBUILD FEED PLANT—Panhandle Feed and Seed Co. at Halfway, recently destroyed by fire, will be rebuilt. Former facilities included grain elevator, flour mill, warehouse, and building for mixing feeds.

SOAP MAKING—Mt. Hood Soap Co., Portland, buys two-story building at cost of \$27,000 and will remodel it with further expenditure of \$100,000 for soap chip and soap flake production. Company plans to install facility for

manufacture of crude glycerin, with output of about 250,000 lbs. per year. Projected construction of new plant for company on Guilds Lake property is not affected by purchase.

ELK PROJECT—Elk Lumber Co., Medford, plans long-range expansion program which will require construction of new stud mill and plywood plant, and expansion of pond, loading, and storage facilities. It is estimated that project will cost \$2,000,000 and take up to ten years to complete, boosting annual log requirement to 80,000,000 ft. and doubling present payroll of 150.

STUDY POWER RATES—Bonneville Power Administrator William A. Pearl states at Portland that rates for electric power from BPA will be studied in effort to work out uniform rate applying to all customers, but that no increase in rates is planned for at least two years.

SUNSET PLANS REFINERY—Sunset Oil Co. will build 20,000-bbl.-a-day refinery in Portland at an estimated total cost of \$30,000,000, only a part of which would be for initial construction. Plant would be supplied with crude oil by barge, and refined products would be shipped up Columbia river to supply Inland Empire, according to present plans.

MALIN AMMONIA TERMINAL—Brea Chemicals, Inc., subsidiary of Union Oil Co. of California, is building 90,000-gal. ammonia distribution terminal and conversion station at Malin, company's thirteenth of this type on West Coast and in Hawaii. Ammonia, in form of liquid under pressure, will be supplied by rail from Brea plant near Los Angeles.

PROPOSE FIRM'S END—Directors of Doernbecher Manufacturing Co., Portland, will present liquidation proposal to stockholders at September 20 meeting. Company operates furniture-manufacturing plant in Portland and a sawmill and logging operation in Clackamas County, employing total of about 500 persons.

UTAH

APPROVE AIRPORT—City commissioners of Salt Lake City approve informally \$1,050,000 improvement plan for municipal airport, to be financed with aid of federal funds.

BUY PHOSPHATE LANDS—Westvaco Mineral Products Division, Food Machinery and Chemical Corp., New York, purchases 130 acres of high-grade phosphate rock and shale deposits in Rich County, Utah. Westvaco now operates four electric furnaces at Pocatello, Idaho, for production of elemental phosphorus from shale rock deposits in that area.

CHEMICAL COMPANY BUILDS—Salt Lake Chemical Co. of Dallas, Tex., begins building \$8,000,000 chemical plant at Salt Lake City for production of an-

hydrous ammonia and dry ice, to employ about 75 persons. Plant is scheduled to be in operation by early 1956, producing 120 tons of anhydrous ammonia daily, which will be marketed as raw material to fertilizer manufacturers in area.

PREDICTION—Experiments on conversion of gilsonite into high-grade coke and naphtha at Uintah Basin mine and pilot plant operated by American Gilsonite Corp. hold promise of large-scale production, with a possible plant at Bonanza, Utah, and use of existing pipeline for moving naphtha to refinery in Salt Lake City. Statement was made by Albert E. Thiele, a director of American Gilsonite and Kennecott Copper Corp.

DIESELS—Union Pacific Railroad Co. orders 50 additional diesel freight locomotives, costing \$8,680,000, from Electro-Motive Division of General Motors Corp. at LaGrange, Ill.

GARFIELD CONTRACT—Contract for building \$1,000,000 addition to casting department of Kennecott Copper Corp.'s electrolytic refinery at Garfield is awarded to Olsen Construction Co., San Francisco. Work includes an extension to refinery maintenance shop.

PRODUCTION PUSH—Bennett's, paint manufacturer in Salt Lake City, plans over \$100,000 expansion program, including additional warehousing space, new factory facilities, and addition of second shift in some operations.

DEDICATION—Kennecott Copper Corp. dedicates \$1,250,000 research center on campus of University of Utah. Staff director is S. R. Zimmerly.

WASHINGTON

TESTING ARMY VEHICLES—Supplemental Army-Ordnance contracts amounting to almost \$2,000,000 are awarded Pacific Car and Foundry Corp., Renton, for testing and storing artillery vehicles.

REBUILDING WHARF—Standard Oil Co. of California will rebuild Pt. Wells dock facilities which were partially destroyed by fire last January. Construction of dock, pipelines, and warehousing will cost an estimated \$1,000,000 and be completed by next summer. New wharf will have berthing space for two sea-going tankers and two barges.

LONG-BELL BUYS MILL—Long-Bell Lumber Co. will purchase M&M Wood Working Corp. plywood plant located on Long-Bell's millsite at Longview.

CLAY DISCOVERY—Latah clay deposit is found on property belonging to Warren Steen in area of Shelly Lake near Spokane. If tests show that chemical properties of clay are satisfactory, clay will be removed by open pit operations and supplied to local cement manufacturer.



GENERAL TRACTOR PLANT—Main plant of General Tractor Co., Inc., Ephrata, Wash., contains two assembly lines, one for farm units and the other for commercial, such as front-end bucket loader and bulldozer units. Size is 80 x 180 ft., exclusive of office and engineering section. Concrete floor is reinforced to carry weight load of 30,000 lb. per sq. ft. Heating is hot water, with three low-pressure boilers. Cost of building plus site and improvements was \$150,000.

SUNSHINE—Manufacturing operations in Spokane plant of Sunshine Biscuits, Inc., will be discontinued, and company will build modern warehouse and delivery center to serve area with products shipped in from other Sunshine plants.

SPEEDING UP—Part-time woodworking plant at Aberdeen operated by Paul and Clifford Hensley goes on full-time operation manufacturing shingle bands, strawberry flats, and other boxes, and may be expanded with construction of new building.

AEC BUYS COAL—Northwest Improvement Co., Roslyn, receives Atomic Energy Commission contract to supply 125,000 tons of coal annually for three years to Hanford Engineering Works. NWI mines, now operating about three days a week, will reportedly go on full five-day week to fill this and other contracts. Contract covers about 15% of total coal requirements for Hanford.

BOEING LETS CONTRACTS—Contract for about \$289,000 covering hangar doors for Boeing Airplane Co. flight center at Larson Air Force Base, near Moses Lake, is awarded International Steel Co., Evansville, Ind. Another contract, for boilers and other equipment, goes to Erie City Iron Works, in the amount of about \$108,000.

NATURAL GAS—Spokane Gas and Fuel Co., owned by Ray C. Fish and associates of Houston, Tex., is granted 25-year franchise by City of Spokane to distribute natural gas delivered by Pacific Northwest Pipeline Corp. Pacific Northwest is signing final contracts with distributing companies in Northwest, among them Spokane Gas, Seattle Gas, Washington Gas and Electric, Cascade Natural Gas. Gas is expected to be available by late 1955. Federal Power Commission has refused requests for rehearing on its authorization of Pacific Northwest as the supplier of natural gas

to this area, which were filed by West-coast Transmission Co. and Trans-Northwest Gas.

ALUMINUM—New aluminum extrusion mill at Aluminum Co. of America's plant in Vancouver begins operations, part of Alcoa's \$6,700,000 expansion of Vancouver fabricating facilities. Aluminum Company of Canada opens new smelter at Kitimat, British Columbia, served by hydroelectric power plant at Kemano, a project which has been worked on for past three years.

FERNDAL REFINERY—General Petroleum Corp.'s \$35,000,000 refinery at Ferndale will be completed before end of year and operate initially at a capacity of 25,000 bbl. daily. Plant will get crude oil via Trans Mountain Pipe Line from Alberta, Canada, and by tanker from Venezuela, if necessary.

CONVERT SEA WATER—University of Washington is reported to be experimenting with freezing-melting technique for deriving fresh water from sea water. Process was developed by Dr. Thomas G. Thompson of university, with Kurt H. Nelson, graduate student now at University of Oklahoma. Backing of federal government's Office of Saline Water Research Coordination is sought.

WYOMING

PIPELINE TO MISSOURI—Western Pipe Line Co., subsidiary of Service Pipe Line Co., Tulsa, Okla., starts work on 630-mi. common carrier crude oil pipe line from Fort Laramie, Wyo., to Freeman, Mo. Line will have design capacity of 200,000 bbl. daily, consisting of 20, 22 and 24-in. pipe. Denver-Julesburg basin will be served by this facility.

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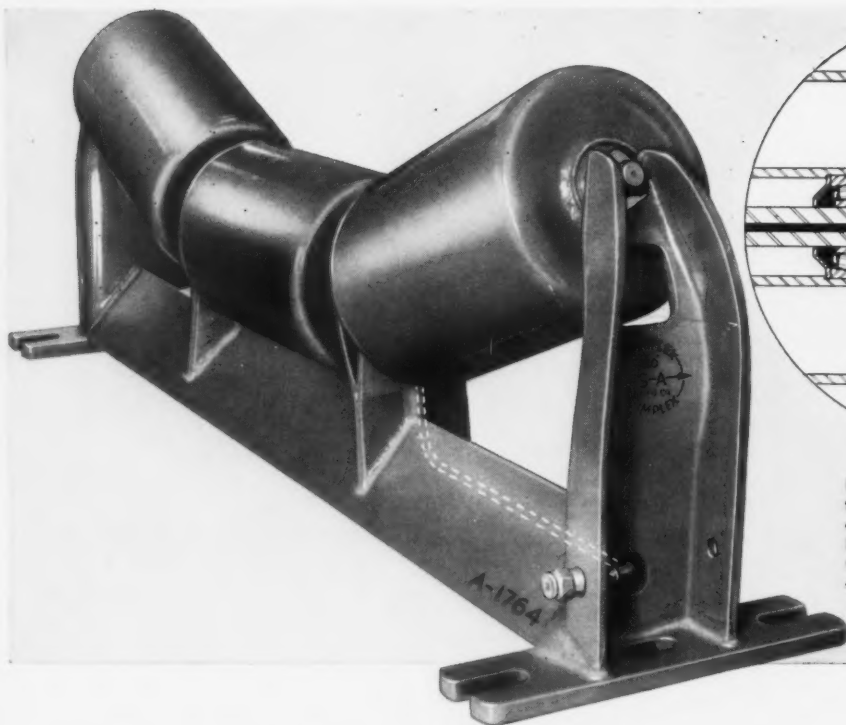
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